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Appendices R-U

Remedial Investigation National Smelting of New Jersey, Inc./ NL Industries, Inc. Site

Pedricktown, New Jersey

NL Industries, Inc.
Hightstown, New Jersey

December 1990

O'BRIEN & GERE

VOLUME III

APPENDICES R - U

REMEDIAL INVESTIGATION
NATIONAL SMELTING OF
NEW JERSEY, INC./
NL INDUSTRIES, INC. SITE

PEDRICKTOWN, NEW JERSEY

NL INDUSTRIES, INC.
HIGHTSTOWN, NEW JERSEY

DECEMBER 1990

APPENDIX R

WETLANDS ASSESSMENT STUDY
of
National Smelting of New Jersey (NSNJ) Site
Pedricktown, New Jersey

for

O'Brien & Gere Engineers, Inc.
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Virginia Beach, Virginia

Project No. 901309
December 6, 1990

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WETLANDS ASSESSMENT STUDY
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EXECUTIVE SUMMARY

Talbot & Associates, Ltd. conducted a wetlands assessment of the 46± Ac. National Smelting of New Jersey (NSNJ) site and adjacent areas located on the north side of the Pennsgrove - Pedricktown Road south of Route 130 near the City of Pedricktown, New Jersey.

The National Smelting of New Jersey (NSNJ) site is not currently in operation and the facilities and landfill on the site are closed. The investigation area is drained by two non-tidal fresh water streams which ultimately flow to the Delaware River. The areas of the site outside of the fences consist of hardwood forest and farm fields.

After studying the maps and information provided by several government agencies, some of which is included in this report, a field investigation was performed to determine the extent of wetlands potentially regulated under Section 404 of the Clean Water Act of 1970. Based on the evaluation of office data and field observations, it is our opinion that portions of this site could be considered non-tidal wetlands by the regulatory agencies. The U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the State of New Jersey - Dept. of Environmental Protection are responsible for making determinations concerning the presence of wetlands on this site.

PART I
PURPOSE AND SCOPE

The purpose of this study was to conduct a wetlands assessment of the 46± Ac. National Smelting of New Jersey (NSNJ) site and adjacent areas located west of Pedricktown, New Jersey. This assessment documents those areas of the site that exhibit characteristics similar to those considered wetlands under the purview of the U. S. Army Corps of Engineers (Corps) and the U.S. Environmental Protection Agency (EPA). The areas investigated during our field investigations included the areas identified on the WETLAND DELINEATION ZONE MAP enclosed in APPENDIX III of this report. Although the majority of our field work was confined to the areas surrounding the existing industrial facilities, our investigations did include preliminary studies of adjacent areas.

The Environmental Planning Department of Talbot & Associates, Ltd. conducted necessary office and field investigations of soils, vegetation, and hydrology to determine whether wetlands were present on this site. A written and graphic description of the wetlands areas found are included in this report. It was the intent of the field work that preceded this study to provide a flagged location of the wetlands boundary located within and immediately adjacent to the property.

This report is intended to provide the reader with a document which is readily understood. Graphics and tables have been employed to facilitate this aim. The body of the report contains pertinent background information on assessment procedures, data collected, results and conclusions. The field reports, which contain the bulk of the raw data, are included in APPENDIX III.

The conclusions and recommendations presented in this report are based on our analysis of data and our familiarity with the wetlands delineation methodology used by the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture Soil Conservation Service.

The conclusions contained herein should not be interpreted as the definitive determination regarding wetlands. Only the Corps and the EPA have the regulatory authority to make such a final determination.

PART II
SITE DESCRIPTION

The investigated area is located on the north side of the Pennsgrove - Pedricktown Road just east of the junction of the road and the Conrail railroad tracks which also dissect the site into two separate areas. State Route 130 runs to the north of the site. Various industrial properties are located either adjacent to or in close proximity of the old smelting facility. Several single-family residential properties are also located in the investigated area.

Approximately half of the site is occupied by the smelting facility and an associated landfill both of which are enclosed by a chain-link fence. The remaining areas of the site are covered by mature hardwood forest and old agricultural fields. The wooded areas are also occupied by a dense understory of greenbriar, blackberry and reeds.

The two streams which flow into the Delaware River are located east and west of the site. Both of these streams have been channelized and dredged to facilitate stormwater run-off; but, they have not been maintained within the past twelve (12) years.

Portions of the site within the fenced area appeared to have disturbed hydrology, soils or vegetation. This was taken in to account during the determinations of the location of our wetlands delineation lines.

The general elevations of the site and its surrounding areas are between two (2) and sixteen feet above mean sea level. Two exceptions to this fact are the landfill and the sanitation mounds located on the site. These approximate elevations are based on the National Geodetic Vertical Datum (0 = mean sea level).

PART III
ASSESSMENT PROCEDURES

The regulatory definition of wetlands used by the U.S. Army Corps of Engineers is as follows:

> "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The emphasis on hydrology, vegetation, and saturated soils in this definition was the basis for the technical procedures and policies outlined in the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" which we used in our wetlands assessment of this site. This methodology was adopted on January 10, 1989. Under the old and the new methodologies, the technical criteria for the three parameters of (1) hydric soils, (2) a prevalence of hydrophytic (wetlands) vegetation, and (3) evidence of water near the surface during the growing season (hydrology) must be satisfied.

Prior to visiting the site, the following documents were investigated by our environmental assessment team:

* U.S.G.S. Map - Marcus Hook Quadrangle
* National Wetlands Inventory Map - Marcus Hook Quadrangle
* Soils Inventory Map for Salem County
* National Hydric Soils List

At the completion of the information research, field investigations were conducted. Soils, vegetation, and hydrology were evaluated. Mapped characteristics of site soils, surface water flow, geology, hydrology and vegetation were reviewed and compared with actual conditions and features found on the site.

The entire site and considerable adjacent area was observed and evaluated. Numerous soil investigations were conducted using a soil probe to a minimum depth of twenty-four (24) inches.

On this particular site, thirty-nine (39) individual locations were examined utilizing the routine on-site delineation method. The locations of the individual site assessments were selected according to the background information assimilated, field observations made on the site, and our professional judgement based on past experience. The data forms for these individual investigations and the SITE SPECIFIC WETLAND DELINEATION LOCATION MAP showing the individual test sites are located in APPENDIX

III. A summary of the site assessments has been placed in a table located in the INTERPRETATION OF DATA section of this report.

Physical evidence of conditions and criteria particular to the presence of wetlands were noted. Special attention was paid to the presence of field indicators of wetlands hydrology such as:

* oxidized root channels associated with living roots
* water marks and drift lines
* water-stained or sediment covered leaves
* surface scoured areas
* morphological plant adaptions
* hydric soil characteristics

The hydrological characteristics of the site were evaluated by measuring the distance between the surface of the ground plane and the top of water or saturated soils present in the individual test holes dug with the soil probe.

The soils were observed by extracting a soil plug with a probe to obtain a soil profile. The color, texture, and characteristics of the soils found were compared to those shown in the soil survey. If there was agreement with the soil survey, no further study was performed. If the soil samples did not agree with the soil survey then further investigations were made to try to determine the extent of any inclusions or the soils were classified according to their observed field indicators.

The vegetation analysis included plant identification in all layers of the existing plant community. Dominant species were then determined and the evaluation of the wetlands indicator status of each finalized.

After the uplands/wetlands interface was determined in the field it was marked with brightly colored flags.

PART IV
INTERPRETATION OF DATA

NATIONAL WETLANDS INVENTORY MAPS - The NWI map shows wetlands existing in the investigation area. These maps were created by the U.S. Fish and Wildlife Service by interpreting aerial photographs and were rarely field verified.

The non-tidal wetlands shown as being present on the project site and its adjacent areas were the following:

PFO1E — Palustrine, Forested, Broad-leaved Deciduous, Seasonally Saturated

PEM5E — Palustrine, Emergent, Narrow-leaved Persistent, Seasonally Saturated

PFO1E SS — Palustrine, Forested/Scrub-Shrub, Broad-leaved Deciduous, Seasonally Saturated

These wetland types are classified according to their biological characteristics. The following definitions apply to the classification nomenclature of the wetlands mapped as being present on this site:

Palustrine - non-tidal wetlands ecosystem

Forested - overstory of trees present

Emergent - plant forms present that protrude above water surface

Forested/Scrub-Shrub - a mixture of overstory and understory plants present

Broad-leaved Deciduous - plants lose their leaves during winter

Narrow-leaved Persistent - dominant plants with narrow leaves that persist from season to season

Seasonally Saturated - soils saturated to the surface for extended periods usually in early spring, but water usually absent by the end of the growing season, surface water seldom present

Our field investigations found the above wetland types present on this site; however, the non-tidal wetlands observed in the field exceeded the areas delineated by the U.S. Fish and Wildlife Service. The location of the majority of these wetlands were found to be located below the eight foot contour.

SOILS - The soil survey for Salem County was studied prior to our site visit. This soil survey produced by the Soil Conservation Service is the most current document available for the

Pedricktown area and is dated May 1969. The soil series shown as being present on this site were checked against the National Hydric Soils List. Their color, texture, and characteristics were noted for later field verification. Although these mapping units require ground truthing, we have found them to be generally accurate.

The major soil series shown to be present on this site are as follows:

Symbol	Series	On National Hydric Soils List
SwB	Sassafrass-Galestown-Woodstown	NO
Fw	Fresh Water Marsh (observed as hydric soil in field)	NO

The soil series observed on the site agreed with those mapped in the soil survey. Individual soil series of the Sassafrass-Galestown-Woodstown complex were observed and documented on the field sheets. With one exception (Test Site #11), our observations of this soil complex did not reveal hydric soils. Our observations of the Fresh Water Marsh soil series did reveal hydric soils at all test sites except Test Site #32. These two exceptions result from these two location being in close proximity to the location of the wetland delineation line. Information on the individual test sites is included in this report in APPENDIX III.

VEGETATION - A site is considered to have met the hydrophytic vegetation criterion for a wetlands when, under normal circumstances, more than 50 % of all dominant species found in all strata are obligate wetlands (OBL), facultative wetlands (FACW), and/or facultative species (FAC). All but five of the test sites investigated had the necessary percentage of dominant hydrophytic species to qualify them as meeting the vegetation criterion for a wetlands. See the individual data forms in APPENDIX III for a more detailed description of the species of plants found at each test site.

HYDROLOGY - The investigated site and its associated wetlands are hydrologically connected to the Delaware River via two channelized streams which flow east and west of the site. These two non-tidal streams flow into a larger drainage channel which crosses a portion of an Army Reservation being used as a spoil site by the U.S. Army Corps of Engineers. This drainage channel flows directly into the Delaware River.

The appropriate tidal wetland aerial maps located at the Salem County Municipal Center did not include any mapped tidal wetlands

in the investigated area. Our field investigations verified that the wetlands located on and adjacent to our site are exclusively non-tidal in character.

Approximately two thirds of the thirty-nine test sites observed met the criteria for wetland hydrology. These sites either had water visible within eighteen inches of the surface or saturated soils within eighteen inches of the surface and other field indicators which suggest that the hydrology criteria is met at some time during the growing season.

The following table summarizes the results of our individual test sites.

TABULATION OF SITE ASSESSMENT DATA
AND
WETLANDS/UPLANDS DETERMINATION

TEST SITE	SOIL SERIES	HYDRIC SOIL	HYDROPHYTIC VEGETATION	HYDROLOGY	CRITERIA MET
1	Fw	YES	YES	YES	YES
2	Fw	YES	YES	NO	NO
3	SwB	NO	NO	NO	NO
4	Fw	YES	YES	YES	YES
5	Fw	YES	YES	YES	YES
6	SwB	NO	NO	NO	NO
7	Fw	YES	YES	YES	YES
8	Fw	YES	YES	YES	YES
9	Swb	NO	NO	NO	NO
10	Fw	YES	YES	YES	YES
11	Galestown	YES	YES	YES	YES
12	Galestown	NO	NO	NO	NO
13	Fw	YES	YES	YES	YES
14	Fw	YES	YES	YES	YES
15	Sassafras	NO	NO	NO	NO

TEST SITE	SOIL SERIES	HYDRIC SOIL	HYDROPHYTIC VEGETATION	HYDROLOGY	CRITERIA MET
16	Fw	YES	YES	YES	YES
17	Fw	YES	YES	YES	YES
18	SwB	NO	YES	NO	NO
19	Fw	YES	YES	YES	YES
20	Fw	YES	YES	YES	YES
21	SwB	NO	YES	NO	NO
22	Fw	YES	YES	YES	YES
23	Fw	YES	YES	YES	YES
24	Galestown	NO	YES	NO	NO
25	Fw	YES	YES	YES	YES
26	Fw	YES	YES	YES	YES
27	Galestown	NO	YES	NO	NO
28	Fw	YES	YES	YES	YES
29	Fw	YES	YES	YES	YES
30	Galestown	NO	YES	NO	NO
31	Fw	YES	YES	YES	YES
32	Fw	YES	YES	NO	NO
33	Galestown	NO	YES	NO	NO
34	Fw	YES	YES	YES	YES
35	Fw	YES	YES	YES	YES
36	SwB	NO	YES	NO	NO
37	Fw	YES	YES	YES	YES
38	Fw	YES	YES	YES	YES
39	SwB	NO	YES	NO	NO

PART V
CONCLUSIONS AND COMMENTS

Portions of this site located below the eight foot elevation and some areas above the eight foot elevation are non-tidal wetlands. These wetland areas are associated with the west and east stream watersheds. In addition to these locations, the two disturbed areas inside the fenced portion of the site adjacent to the railroad tracks are also experiencing ponding at this time and could be considered non-tidal wetlands by the U. S. Army Corps of Engineers according to the wetland criteria set forth in the Federal Delineation Manual.

Flags have been placed along the lines we feel determine the limitations of the non-tidal wetlands located in the investigation area. Other wetland determinations have been made on adjacent properties utilizing on or off site observations and aerial map analysis. These delineations may not be flagged in the field. Wetland determinations by others on adjacent properties were also utilized in the preparation of this report. The SITE AND ADJACENT AREA WETLAND DELINEATION LOCATION MAP included in APPENDIX III graphically depicts the wetlands/uplands interface line determinations made during the preparation of this document.

We contacted Bruce Stoneback with the Division of Coastal Resources/Bureau of Coastal Regulations for the State of New Jersey concerning information relating to state regulations for non-tidal wetlands. He informed us that typically non-tidal wetlands in New Jersey are regulated under the Fresh Water Protection Act of 1988. This National Smelting of New Jersey (NSNJ) site is on the National Priorities List and is subject to CERCLA. Regulatory Guidance Letter No. 85-7, issued on July 5, 1985, gives the Environmental Protection Agency necessary authority to allow a disturbance in a wetland associated with this site without obtaining a permit from other regulatory agencies. A copy of this RGL is enclosed in APPENDIX III of this report.

This report represents a Talbot & Associates, Ltd. determination of the limits of wetlands on this site. All authority for final wetlands determinations is held by the U.S. Army Corps of Engineers subject to the review of the U.S. Environmental Protection Agency.

The work performed in conjunction with this report, and the data developed, is intended as a description of available information at the dates and locations described. This report does not warrant against operations or conditions present of a type or at a location not investigated.

This report is not intended to address, assess, or otherwise determine, if any soil contamination, waste emplacement, or groundwater contamination exists on this site.

Talbot & Associates, Ltd. has based this wetlands assessment upon observable field conditions and available data in private and public documents, books and publications. Any necessary permitting procedures were considered to be outside the scope of this wetlands assessment.

APPENDIX I
SOURCES OF INFORMATION

SOURCES OF INFORMATION

Data Name	Source
U.S.G.S. Quad Map(s) (1:2400)	U.S. Dept. of Interior Geological Survey
National Wetlands Inventory Map(s) (1:2400)	U.S. Fish & Wildlife Service
Aerial Photograph - 1963	U.S.D.A. Soil Conservation Service
Aerial Photograph - 1975	Salem County, New Jersey Municipal Center
Aerial Photograph - 1982	O'Brien & Gere Engineers, Inc.
Infrared Aerial Photograph - 1980	U.S.D.A. Soil Conservation Service
Soil Survey	U.S.D.A. Soil Conservation Service
Soil Taxonomy - 1988 ed.	U.S. Dept. of Agriculture Soil Conservation Service
Hydric Soils of the U.S.- 1985	U.S.D.A. Soil Conservation Service
Munsell Soil Color Charts	Kollmorgan Instruments Corp.
Federal Manual for Identifying and Delineating Jurisdictional Wetlands - Jan. 1989	U.S. Army Corps of Engineers U.S. Environmental Protection Agency U.S. Fish & Wildlife Service U.S.D.A. Soil Conservation Service
Wetlands of New Jersey - 1985	Ralph W. Tiner, Jr.
Field Guide to Nontidal Wetland Identification	Ralph W. Tiner, Jr.
National List of Plant Species That Occur In Wetlands: Northeast (Region I)	U.S. Fish & Wildlife Service
Classification of Wetlands and Deepwater Habitats of the United States	U.S. Fish & Wildlife Service U.S. Dept. of the Interior

The Field Guide to Wildlife Habitats of the Eastern United States	Janine M. Benyus
Wetlands Plants of the Eastern United States (w/supplement)	U.S. Army Corps of Engineers
Aquatic Vegetation of New Jersey	D.E. Fairbrothers E.T. Moul A.R. Essbach D.N.Riemer D.A. Schallock
Marsh and Aquatic Vascular Plants of North Carolina	Ernest O. Beal North Carolina Agricultural Research Service
Non-tidal Wetlands Protection: a Handbook for Maryland Local Governments	Tidewater Administration, Maryland Dept. of Natural Resources
Highways and Wetlands: 1. Interim Procedural Guidelines 2. Impact Assessment, Mitigation and Enhancement Measures 3. Compensating Wetlands Losses	U.S. Department of Transportation, Federal Highway Administration
Wetland Creation and Restoration, The Status of the Science	Edited by: Jon A. Kusler Mary E. Kentula
Understanding the Game of the Environment	Agricultural Information Bulletin No. 426, U.S. Dept. of Agriculture Forest Service
Living in the Environment Concepts, Problems, and Alternatives	G. Tyler Miller, Jr.
Introduction to Environmental Science	Joseph M. Moran Michael D. Morgan James H. Wiersma
Environmental Science The Study of Interrelationships	Eldon D. Enger J. Richard Kormelink Bradley F. Smith Rodney J. Smith
Ecology and Field Biology, third edition	Robert Leo Smith
Ecology of Inland Waters and Estuaries	George K. Reid Richard D. Wood

Manual of the Vascular Flora	Albert E. Radford Harry E. Ahles C. Ritchie Bell
Textbook of Dendrology	William M. Harlow and Ellwood S. Harrar
Manual of the Trees of North America - Vol. 1 & 2	Charles Sprague Sargent
Trees of Arkansas	Dwight M. Moore, Arkansas Forestry Commission
A Field Guide to Trees and Shrubs	George A. Petrides
Field Guide to North American Wildflowers - Eastern Region	William A. Niering Nancy C. Olmstead
How to Know the Wildflowers	Mrs. William Starr Dana
Newcomb's Wildflower Guide	Lawrence Newcomb
A Field Guide to Wildflowers	Robert Tory Peterson and Margaret McKenny
Weeds of the North Central States	Univ. of Illinois, Agricultural Experiment Station - Circular 718
Common Weeds of the United States	U.S. Department of Agriculture
How to Know the Ferns	Frances Theodora Parsons
Fern Finder	Anne C. Hallowell Barbara G. Hallowell

APPENDIX II
GLOSSARY

GLOSSARY

Adaption	The condition of showing an ability to live in a particular environment, as applied to a living thing or any structure or function of that living thing.
Aerobic	A condition in which molecular oxygen is a part of the environment.
Anaerobic	A condition in which molecular oxygen is absent from the environment
Areal Cover	A measure of dominance that defines the degree to which above ground portions of plants cover the ground surface.
Basal Area	The cross-sectional area of a tree trunk measured in square inches, etc., 4.5 feet above ground level.
Bench Mark	A fixed, more or less permanent reference point or object of known elevation.
Baseline	A line, usually taken from some prominent feature such as a fence or unimproved road, from which sampling transects extend into a site for which a jurisdictional wetlands determination is to be made.
Bryophytes	Group of nonvascular plants comprising the liverworts and mosses.
Buttressed	A swelling or broadened, spreading base of a tree responding to inundation or soil saturation; an adaption to provide stability in soft soils.
Capillary Fringe	A zone immediately above the water table in which water is drawn upward from the water table by capillary action.
Chroma	The relative purity or saturation of a color; intensity of distinctive hue as related to grayness; one of the three variables of color.
Concretion	A concentration of chemical compounds such as iron oxide or calcium carbonate in the form of a lump or grain of varying hardness and size; formed when the compounds precipitate out of soils deficient in oxygen.
Contour	An imaginary line of constant elevation of the ground surface.

Criteria	Technical requirements upon which a judgement can be based.
Detritus	Fragments of plant parts found on the soil surface or in water.
Diameter at Breast Height	Width of a plant stem as measured at 4.5 feet above the surface (DBH).
Dominance	Spatial extent of a species; commonly the most abundant species in any given vegetative stratum.
Drift Line	A "line" of small bits of organic material found on stationary objects such as vegetation, providing evidence of inundation and directional flow of water.
Duff	The matted, partly decomposed, organic surface layer of forested soils.
Evergreen	Plant that retains its leaves at the end of the growing season and usually remains green through the winter.
Facultative Species	Species that can occur both in wetlands and uplands; there are three subcategories of facultative species: (1) FACULTATIVE WETLAND PLANTS (FACW) that usually occur in wetlands, but occasionally are found in nonwetlands, (2) FACULTATIVE PLANTS (FAC) that are equally likely to occur in wetlands or nonwetlands, and FACULTATIVE UPLAND PLANTS (FACU) that usually occur in nonwetlands, but occasionally are found in wetlands.
Fern Allies	A group of nonflowering vascular plants comprised of clubmosses, small clubmosses, and quillworts.
Flooded	A condition in which the soil surface is periodically or temporarily covered with flowing water from any source.
Flora	A list or manual of all plant species that may occur in an area.
Forbs	Broad-leaved herbs, in contrast to bryophytes, ferns, fern allies, and graminoids.
Gleyed	A soil condition in which the soil surface is periodically or temporarily covered with water.
Graminoids	Grasses and grasslike plants such as sedges and rushes.

Groundwater	Water below the surface of the ground whose pressure is greater than atmospheric pressure.
Growing Season	The portion of the year when soil temperatures are above biologic zero (41 degrees Fahrenheit).
Hardpan	A very dense soil layer caused by compaction or cementation of soil particles by organic matter, silica, sesquioxides, or calcium carbonate, for example.
Herbs	Nonwoody (herbaceous) plants including graminoids, forbs, ferns, fern allies, and nonwoody vines.
Horizon	A distinct layer of soil having similar properties and laying parallel to the soil surface.
Hue	A characteristic of color related to one of the main spectral colors, or various combinations of these principle colors; one of the three variables of color.
Hydric Soil	Soil which is saturated, ponded or flooded long enough during the growing season to develop oxygen-poor (anaerobic) conditions in the upper portion.
Hydrology	The science dealing with the properties, distribution, and circulation of water.
Hydrophytic Vegetation	Plant life growing in water or in a soil or substrate which is at least periodically deficient in oxygen as a result of water collecting in a locality.
Indicator	Any observable condition or object typifying a chosen condition or environment.
Inundation	A condition in which water temporarily or permanently covers a land surface.
Litter	Undecomposed plant and animal material on the forest floor above the organic (duff) layer.
Map Unit	A portion of a map depicting an area having some common characteristic.
Matrix	The natural soil material composed of both mineral and organic matter; matrix color refers to the predominant color of the soil in a particular horizon.
Mineral Soil	Any soil consisting primarily of mineral (sand, silt, and clay) material, rather than organic matter.

Mottles	Spots or streaks of a different color or shade than the soil matrix in a given soil layer.
Nonhydric Soil	A soil that has developed under predominantly aerobic soil conditions.
Nontidal	A waterbody that is not influenced by tides.
Obligate Wetland Species	A plant species that is nearly always found in wetlands (99% probability).
Organic Soil	A soil composed of organic soil materials [peats (histosols) and mucks].
Oxidized	Oxidized channels and soil surrounding living roots. Rhizospheres and rhizomes of hydrophytic plants.
Permeability	The quality of the soil that enables water to move downward through the profile.
Plant Community	The plant populations existing in a shared habitat or environment.
Ponded	A condition in which free water covers the soil surface.
Prevalence Index	A weighed average measure of the sum of the frequency of occurrences of all species along a single transect.
Profile	Vertical section of the soil through all its horizons, extending into the parent material.
Quadrat	Sample units or plots varying in size, shape, number and arrangements, depending on the vegetation, site conditions and purpose of study.
Range	Set of conditions (usually referring to temperature or geography) throughout which an organism naturally occurs.
Relief	The change in elevation of a land surface between two points.
Rhizosphere	The zone of soil in which interactions between living plant roots and microorganism occur.
Sample Plot	An observation point at which a wetlands determination is made.
Sapling	Woody vegetation between 0.4 to 5.0 inches DBH and greater than or equal to 20 feet in height,

exclusive of woody vines.

Saturated	A condition in which all easily drained voids (pores) between soil particles are temporarily or permanently filled with water.
Seedling	A young tree that is generally less than 3 feet high.
Shrub	Woody vegetation usually greater than 3 feet but less than 20 feet tall, including multi-stemmed, bushy shrubs and small trees and saplings.
Soil Phase	A subdivision of a soil series based on features that affect the use and management of the soil (e.g. slope, surface texture, and stoniness).
Soil Series	A group of soils having horizons similar in differentiating characteristics and arrangements in the soil profile, except the texture of the surface layer.
Soil Structure	The combinations or arrangement of primary soil particles into secondary particles, units, or peds.
Soil Texture	The relative proportions of the various sizes of particles (silt, sand and clay) in a soil.
Stratum	A layer of vegetation used to determine dominant species in a plant community.
Surface Water	Water present above the substrate or soil surface.
Tidal	Water levels that periodically fluctuate due to the action of the moon and the sun upon the rotation of the earth.
Transect	A line on the ground along which sample plots or points are established for sampling data needed for a wetlands determination.
Transpiration	The process in plants by which water is released into the atmosphere, primarily through stomata.
Tree	A woody plant 5 inches or greater in DBH and 20 feet or taller.
Upland	An area which has insufficient wetness to develop hydric soils, hydrologic characteristics of wetlands, or the hydrophytic vegetation characteristics of wetlands.
Value	The relative lightness or intensity of color; one

of the three variables of color.

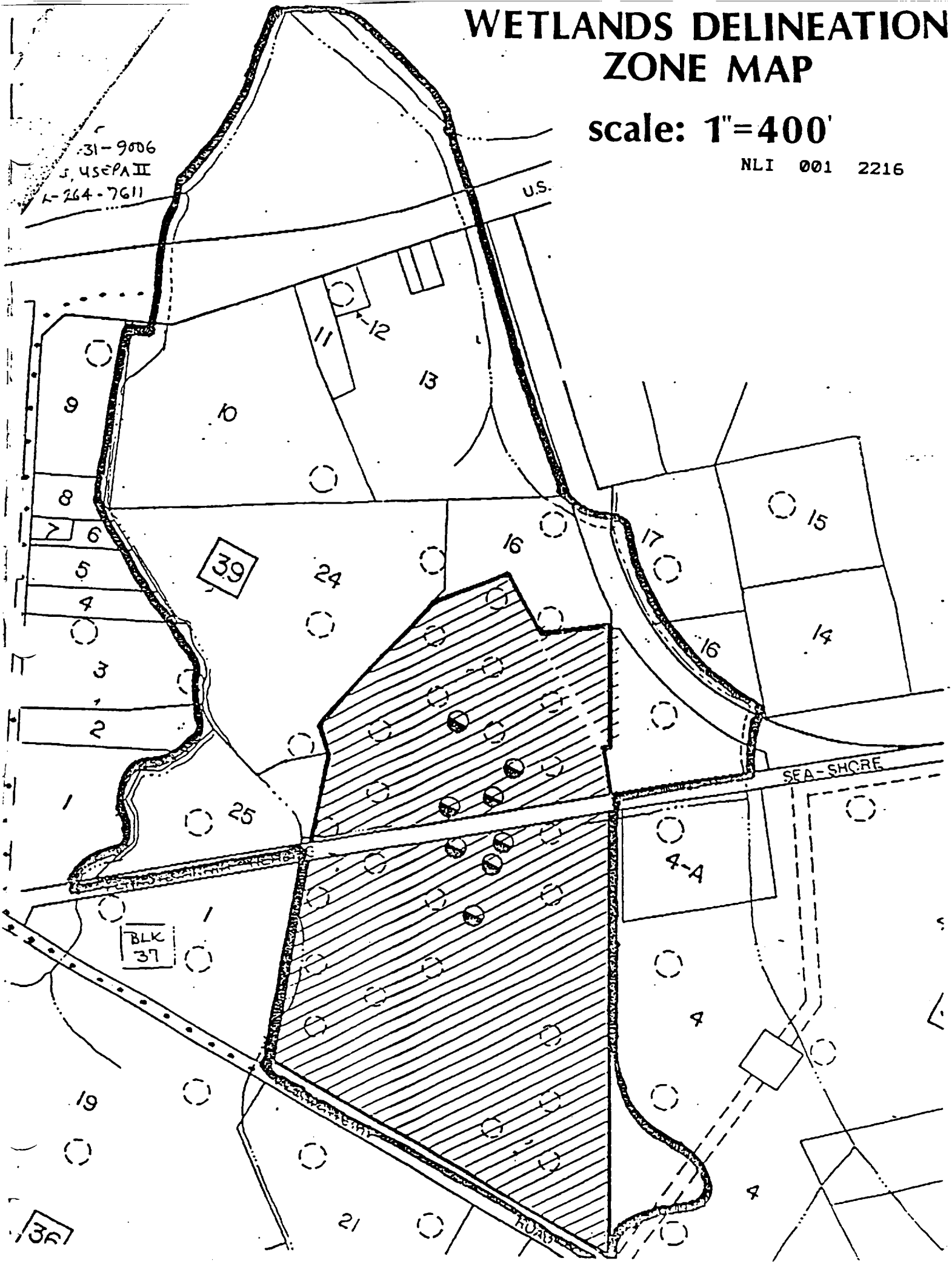
Water Mark	A line on vegetation or other upright structures that represents the maximum height reached in an inundation event.
Water Table	The zone of saturation at the highest average depth during the wettest season; it must be at least 6 inches thick and persist in the soil for more than a few weeks.
Wetlands	Areas that under normal circumstances have hydrophytic vegetation, hydric soils, and wetlands hydrology.
Wetlands Hydrology	Permanent or periodic inundation or prolonged soil saturation sufficient to create anaerobicy conditions in the soil.
Zone of Influence	The area contiguous to a ditch, channel, or other drainage structure that is directly affected by it.

APPENDIX III
DATA SHEETS, REGULATORY & SOILS INFORMATION, AND MAPS

WETLANDS DELINEATION ZONE MAP

scale: 1"=400'

NLI 001 2216



RGL 85-7:
Superfund Projects

Issued 7/5/85 Expires 12/31/91

1. Recently, the Chief Counsel, Mr. Lester Edelman, responded to a letter from Mr. William N. Hedeman, Jr., Director, Office of Emergency and Remedial Response, Environmental Protection Agency (EPA) Which dealt with the need for Department of Army authorizations for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) actions. This letter summarizes Mr. Edelman's opinion and provides operating guidance for field interaction with the EPA.

2. The EPA's basic position is that Congress did not intend for CERCLA response actions to be subject to other environmental laws. Rather, as a matter of sound practice, CERCLA response actions generally should meet the standards established by those laws. Consequently, it is the EPA's position that neither it nor the states, in pursuing response actions at the location of the release or threatened release under the authority of CERCLA, are required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act for those actions.

3. Mr. Edelman stated in part that he has some reservations about the position that the EPA has taken. Nevertheless, he recognizes that the EPA has the primary authority for the interpretation and application of CERCLA, and therefore would defer to the EPA's reading of its own statutory authorities, at least for the time being.

4. In light of this legal opinion, FOAs should not require applications for the EPA or state response actions at the location of the release or threatened release pursued under the authority of CERCLA. Any permit applications in process should be terminated.

5. Both the EPA and OCE believe that the FOAs' expertise in assessing the public interest factors for dredging and filling operations can contribute to the overall quality of the CERCLA response action. The Director of Civil Works will be establishing a group from his staff to work with the EPA staff to develop a framework for integrating the Corps Section 10, Section 404 and, if appropriate, Section 103 concerns into the EPA's substantive Superfund reviews.

6. Until specific guidance is provided from OCE, FOAs should provide technical support to the EPA regions and/or the states on matters within their field of expertise.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #1

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Hamamelis virginiana	FAC	Shrub
4. Smilax rotundifolia	FAC	Herb.
5. Vitis rotundifolia	FAC	Herb.
6. Woodwardia areolata	FACW	Herb.
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soil of low chroma exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
buttressed tree trunks
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #2

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain) Area contains fill material

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Hamamelis virginiana	FAC	Shrub
4. Hamamelis virginiana	FAC	Herb.
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soil of low chroma exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
None found to exist at site; site is slightly above up/wet boundary
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of hydrology found to exist

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Hydrology criterion not met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #3

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain) Area contains fill material

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Prunus pensylvanica	FACU	Shrub
4. Solidago canadensis	FACU	Herb.
5. Rubus allegheniensis	FACU	Herb.
6. Sassafras albida	FACU	Shrub
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 33%
Is the hydrophytic vegetation criterion met? Yes _____ No X
Rationale: Less than 50% facultative or wetter vegetation

SOILS

Series/phase: Sassafras-Galestown-Woodstown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: unobtainable-fill mat. Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soil of high chroma exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
None found to exist at site; site is slightly above up/wet boundary
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of hydrology found at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Wetland indicators not found

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #4

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Acer rubrum	FAC	Shrub
3. Hamamelis virginiana	FAC	Shrub
4. Smilax rotundifolia	FAC	Herb.
5. Magnolia virginiana	FACW	Canopy
6. Magnolia virginiana	FACW	Shrub
7. Lonicera japonica	FAC	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes _____ No X Gleyed? Yes X No _____
Matrix Color: 5 YR 2.5/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Gleyed soil exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 12"
List other field evidence of surface inundation or soil saturation.
Buttressed tree trunks, hummocky topography
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion me.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #5

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Acer rubrum	FAC	Shrub
3. Hamamelis virginiana	FAC	Shrub
4. Smilax rotundifolia	FAC	Herb.
5. Clethra alnifolia	FAC	Shrub
6. Magnolia virginiana	FACW	Shrub
7. Lonicera japonica	FAC	Herb.
8. Vitis rotundifolia	FAC	Herb.
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 12"
List other field evidence of surface inundation or soil saturation.
Buttressed tree trunks, hummocky topography
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #6

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain) Area contains fill material

VEGETATION

Dominant Plant Species	Status	Stratum
1. Prunus serotina	FACU	Canopy
2. Prunus serotina	FACU	Shrub
3. Hamamelis virginiana	FACW	Shrub
4. Phragmites australis	FACW	Herb.
5. Lonicera japonica	FAC	Herb.
6. Allium canadense	FACU	Herb.
7. Rubus allegheniensis	FACU	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 43%
Is the hydrophytic vegetation criterion met? Yes _____ No X
Rationale: Less than 50% facultative or wetter vegetation

SOILS

Series/phase: Sassafras-Galestown-Woodstown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 3/3 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soil of high chroma exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
None found to exist at site
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of hydrology found at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Wetland indicators not found

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #7

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Acer rubrum	FAC	Shrub
3. Hamamelis virginiana	FAC	Shrub
4. Smilax rotundifolia	FAC	Herb.
5. Vitis rotundifolia	FAC	Herb.
6. Prunus serotina	FACU	Shrub
7. Lonicera japonica	FAC	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 86%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes X No _____
Matrix Color: 5 YR 2.51 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Gleyed soil exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 12"
List other field evidence of surface inundation or soil saturation.
Buttressed tree trunks, surface roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #8

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Acer rubrum	FAC	Shrub
3. Hamamelis virginiana	FAC	Shrub
4. Smilax rotundifolia	FAC	Herb.
5. Vitis rotundifolia	FAC	Herb.
6. Woodwardia areolata	FACW	Herb.
7. Lonicera japonica	FAC	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 12"
List other field evidence of surface inundation or soil saturation.
Buttressed tree trunks, surface roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion me.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #9

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Prunus serotina	FACU	Canopy
2. Prunus serotina	FACU	Shrub
3. Acer rubrum	FAC	Canopy
4. Liquidambar styriciflua	FAC	Canopy
5. Lonicera japonica	FAC	Herb.
6. Solidago canadensis	FACU	Herb.
7. Rubus allegheniensis	FACU	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 43%
Is the hydrophytic vegetation criterion met? Yes _____ No X
Rationale: Less than 50% facultative or wetter vegetation

SOILS

Series/phase: Sassafras-Galestown-Woodstown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/8 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soil of high chroma exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
None found to exist at site
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of hydrology found at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Wetland indicators not found

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #10

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Canopy
2. Acer rubrum	FAC	Shrub
3. Phragmites australis	FACW	Herb.
4. Polygonum pensylvanicum	FACW	Herb.
5. Rubus allegheniensis	FACU	Herb.
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 80%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No ?
Is the soil: Mottled? Yes _____ No X Gleyed? Yes X No _____
Matrix Color: 5 YR 2.51 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Gleyed soil exists at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 12"
List other field evidence of surface inundation or soil saturation.
Buttressed tree trunks, hummocky topography
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion me

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #11

Do normal environmental conditions exist at the plant community?
Yes _____ No __X__ (If no, explain) Edge of field
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes __X__ No _____ (If yes, explain) Edge of field

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FAC	Shrub
2. Hamamelis virginiana	FAC	Shrub
3. Phragmites australis	FACW	Herb.
4. Aster spp.	N/A	Herb.
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes __X__ No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Galestown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No __X__ Gleyed? Yes _____ No __X__
Matrix Color: 10 YR 3/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes __X__ No _____
Rationale: Soils of low chroma exist in site

HYDROLOGY

Is the ground surface inundated? Yes _____ No __X__
Is the soil saturated? Yes __X__ No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
Surface roots
Is the wetland hydrology criterion met? Yes __X__ No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes __X__ No _____
Rationale for jurisdictional decision: All three wetlands criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #12

Do normal environmental conditions exist at the plant community?
Yes _____ No __X__ (If no, explain) Site is fielded
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes __X__ No _____ (If yes, explain) Site is fielded

VEGETATION

Dominant Plant Species	Status	Stratum
1. Rhus copallinum	NI	Shrub
2. Asparagus officinalis	NL	Herb.
3. Prunus serotina	FACU	Shrub
4. Aster spp.	N/A	Herb.
5. Poaceae spp.	N/A	Herb.
6. Rosa multiflora	FACU	Shrub
7. Andropogon virginicus	FACU	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 0%
Is the hydrophytic vegetation criterion met? Yes _____ No __X__
Rationale: Less than 50% facultative or wetter vegetation

SOILS

Series/phase: Galestown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No _X_ Undetermined ___
Is the soil a Histosol? Yes__ No_X Histic epipedon present? Yes__ No_X
Is the soil: Mottled? Yes _____ No __X__ Gleyed? Yes _____ No __X__
Matrix Color: 10 YR 5/4 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No __X__
Rationale: No hydric soil indicators found at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No __X__
Is the soil saturated? Yes _____ No __X__
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No __X__
Rationale: No field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No __X__
Rationale for jurisdictional decision: None of the criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #13

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Shrub
2. Liquidambar styriciflua	FAC	Shrub
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

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SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes X No _____
Matrix Color: 5 YR 2.5/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Gleyed soils exist at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 6"
List other field evidence of surface inundation or soil saturation.
Hummocky topography, buttressed trunks, surface roots, multi-trunks
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Hydrology field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #14

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Shrub
2. Prunus serotina	FACU	Shrub
3. Rhus copallinum	NI	Shrub
4. Polygonum persicaria	FACW	Herb.
5. Vitis rotundifolia	FAC	Herb.
6. Lonicera japonica	FACU	Shrub
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 60%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 3/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
Buttressed trunks
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion me.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #15

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain) Site is fielded
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain) Site is fielded

VEGETATION

Dominant Plant Species	Status	Stratum
1. Rhus copallinum	NI	Shrub
2. Prunus pensylvanica	FACU	Shrub
3. Prunus serotina	FACU	Shrub
4. Aster spp.	N/A	Herb.
5. Fragaria virginiana	FACU	Herb.
6. Lonicera japonica	FAC	Herb.
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 25%
Is the hydrophytic vegetation criterion met? Yes _____ No X
Rationale: Less than 50% facultative or wetter vegetation

SOILS

Series/phase: Sassafras Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 7.5 YR 4/6 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No X
Rationale: No hydric soil indicators found at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: No wetlands criterion met

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #16

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Hamamelis virginiana	FAC	Shrub
2. Phragmites australis	FACW	Herb.
3. Vitis rotundifolia	FAC	Herb.
4. Smilax rotundifolia	FAC	Herb.
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No__
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist in site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 12"
List other field evidence of surface inundation or soil saturation.
Surface roots, discolored leaf litter
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Hydrology field indicators found at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion me

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #17

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Hamamelis virginiana	FAC	Shrub
2. Smilax rotunfifolia	FAC	Herb.
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist in site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
Surface roots, buttressed trunks
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Hydrology field indicators found at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #18

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Shrub
2. Liquidambar styriciflua	FAC	Shrub
3. Prunus serotina	FACU	Shrub
4. Lonicera japonica	FAC	Herb.
5. Rubus allegheniensis	FACU	Herb.
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 60%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

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SOILS

Series/phase: Sassafras-Galestown-Woodstown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/3 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators found to exist at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all wetland criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #19

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Hamamelis virginiana	FAC	Shrub
3. Smilax rotunidifolia	FAC	Herb.
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% facultative or wetter vegetation

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 2/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist in site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 6"
List other field evidence of surface inundation or soil saturation.
Surface roots, buttressed trunks
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Hydrology field indicators found at site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three wetlands criterion met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #20

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canop
2. Liquidambar styriciflua	FAC	Canop
3. Acer rubrum	FACW	Shrub
4. Liquidambar styriciflua	FAC	Shrub
5. Prunus serotina	FACU	Shrub
6. Hamamelis virginiana	FAC	Shrub
7. Smilax rotundifolia	FAC	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 86%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

---

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.
Buttressed trunks, surface roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #21

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Prunus serotina	FACU	Canopy
4. Ilex opaca	FACU	Shrub
5. Prunus serotina	FACU	Shrub
6. Liquidambar styriciflua	FAC	Shrub
7. Smilax rotundifolia	FAC	Herb.
8. Lonicera japonica	FACU	Herb.
9. Smilax rotundifolia	FAC	Herb.
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 55%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

---

SOILS

Series/phase: Sassafran-Galestown-Woodstown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/6 Mottle Colors: N/A
Other hydric soil indicators: None found
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.
None found
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of wetland hydrology found at site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Wetland criteria is not met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #22

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canop
2. Fraxinus pennsylvanica	FACW	Canop,
3. Acer rubrum	FACW	Shrub
4. Polygonum pensylvanicum	FACW	Herb.
5. Boehmeria cylindrica	FACW	Herb.
6. Pilea pumila	FACW	Herb.
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

---

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 2/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 3"
List other field evidence of surface inundation or soil saturation.
Buttressed trunks, surface roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #23

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Prunus serotina	FACU	Canopy
4. Liquidambar styriciflua	FAC	Shrub
5. Prunus serotina	FACU	Shrub
6. Acer rubrum	FACW	Shrub
7. Ilex opaca	FACU	Shrub
8. Vaccinium corymbosum	FACW	Shrub
9. Woodwardia areolata	FACW	Herb.
10. Osumunda cinnamomea	FACW	Herb.

Percent of dominant species that are OBL, FACW, and/or FAC 80%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

---

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
Buttressed trunks, surface roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #24

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Acer rubrum	FACW	Shrub
4. Liquidambar styriciflua	FAC	Shrub
5. Vaccinum corymbosum	FAC	Shrub
6. Ilex opaca	FACU	Shrub
7. Lyonia ligustrinaia	FACW	Shrub
8. Smilax rotundifolia	FAC	Herb.
9. Acer rubrum	FACW	Herb.
10. Liquidambar styriciflua	FAC	Herb.

Percent of dominant species that are OBL, FACW, and/or FAC 90%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

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SOILS

Series/phase: Galestown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/6 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No X
Rationale: Field indicators of wetland hydrology are not found

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all of the criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #25

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Acer rubrum	FACW	Shrub
4. Liquidambar styriciflua	FAC	Shrub
5. Lyonia ligustrina	FACW	Shrub
6. Lyonia ligustrina	FACW	Herb.
7. Woodwardia aerolata	FACW	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

---

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 2.5 Y 6/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 6"
List other field evidence of surface inundation or soil saturation.
Oxidized roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

---

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #26

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canop
2. Liquidambar styriciflua	FAC	Canopy
3. Acer rubrum	FACW	Shrub
4. Liquidambar styriciflua	FAC	Shrub
5. Lyonia ligustrina	FACW	Shrub
6. Vaccinium corymbosum	FAC	Herb.
7. Lyonia ligustrina	FACW	Herb.
8. Woodwardia aerolata	FACW	Herb.
9. Smilax rotundifolia	FAC	Herb.
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

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SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes X No _____ Gleyed? Yes _____ No X
Matrix Color: 2.5 Y 6/2 Mottle Colors: 7.5 YR 6/8
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
Oxidized roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #27

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Quercus alba	FACU	Canopy
4. Quercus rubra	FACU	Shrub
5. Vaccinum corymbosum	FAC	Shrub
6. Ilex opaca	FACU	Shrub
7. Lyonia ligustrinaia	FACW	Shrub
8. Smilax rotundifolia	FAC	Herb.
9. Acer rubrum	FACW	Herb.
10. Liquidambar styriciflua	FAC	Herb.

Percent of dominant species that are OBL, FACW, and/or FAC 70%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

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SOILS

Series/phase: Galestown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/8 Mottle Colors: _____
Other hydric soil indicators: None found
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.
None found
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: Field indicators of wetland hydrology not found at site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all of the criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #28

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canop
2. Liquidambar styriciflua	FAC	Canop,
3. Acer rubrum	FACW	Shrub
4. Liquidambar styriciflua	FAC	Shrub
5. Lyonia ligustrina	FACW	Shrub
6. Lyonia ligustrina	FACW	Herb.
7. Woodwardia aerolata	FACW	Herb.
8. Rubus allegheniensis	FACU	Herb.
9. Smilax rotundifolia	FAC	Herb.
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 89%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wet

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SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 2.5 Y 6/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 8"
List other field evidence of surface inundation or soil saturation.
Oxidized roots, buttressed trunks
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #29

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Acer rubrum	FACW	Shrub
4. Liquidambar styriciflua	FAC	Shrub
5. Lyonia ligustrina	FACW	Shrub
6. Vaccinium corymbosum	FAC	Herb.
7. Lyonia ligustrina	FACW	Herb.
8. Woodwardia aerolata	FACW	Herb.
9. Smilax rotundifolia	FAC	Herb.
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

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SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes X No _____ Gleyed? Yes _____ No X
Matrix Color: 2.5 Y 6/2 Mottle Colors: 7.5 YR 6/8
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
Oxidized roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #30

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canop
2. Liquidambar styriciflua	FAC	Canopy
3. Quercus alba	FACU	Canopy
4. Quercus rubra	FACU	Shrub
5. Vaccinum corymbosum	FAC	Shrub
6. Ilex opaca	FACU	Shrub
7. Rubus allegheniensis	FACU	Herb.
8. Smilax rotundifolia	FAC	Herb.
9. Acer rubrum	FACW	Herb.
10. Liquidambar styriciflua	FAC	Herb.

Percent of dominant species that are OBL, FACW, and/or FAC 60%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

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SOILS

Series/phase: Galestown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/8 Mottle Colors: _____
Other hydric soil indicators: None found
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.
None found
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: Field indicators of wetland hydrology not found at site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all of the criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #31

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain) Area has been excavated

VEGETATION

Dominant Plant Species	Status	Stratum
1. Polygonum pensylvanicum	FACW	Herb.
2. Juncus effusus	FACW	Herb.
3. Aster vimineus	FAC	Herb.
4. Phragmites australis	FACW	Herb.
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

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SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes X No _____ Gleyed? Yes _____ No X
Matrix Color: N/A due to disturbance Mottle Colors: N/A-disturbed area
Other hydric soil indicators: A & B horizon removed, C horizon consisted of mottled clay
Is the hydric soil criterion met? Yes X No _____
Rationale: Assumed to exist due to visual evidence of mottling

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HYDROLOGY

Is the ground surface inundated? Yes X No _____
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: surface
List other field evidence of surface inundation or soil saturation.
Discolored leaf litter, sediment deposits
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #32

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canop
2. Liquidambar styriciflua	FAC	Canop
3. Acer rubrum	FACW	Shrub
4. Liquidambar styriciflua	FAC	Shrub
5. Vaccinium corymbosum	FAC	Shrub
6. Smilax rotundifolia	FAC	Herb.
7. Woodwardia aerolata	FACW	Herb.
8. Osumunda cinnamomea	FACW	Herb.
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

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SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.
None found
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all of the criteria met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #33

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Prunus serotina	FACU	Canopy
4. Liquidambar styriciflua	FAC	Shrub
5. Lyonia ligustrina	FACW	Shrub
6. Prunus serotina	FACU	Shrub
7. Acer ruburm	FACW	Shrub
8. Lyonia ligustrina	FACW	Herb.
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 75%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

---

SOILS

Series/phase: Galestown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/6 Mottle Colors: _____
Other hydric soil indicators: None found
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.
None found
Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all of the criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #34

Do normal environmental conditions exist at the plant community?
Yes _____ No __X__ (If no, explain) Area has been cleared
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes __X__ No _____ (If yes, explain) Area has been cleared

VEGETATION

Dominant Plant Species	Status	Stratum
1. Polygonum pensylvanicum	FACW	Herb.
2. Aster spp.	N/A	Herb.
3. Aster vimineus	FAC	Herb.
4. Phragmites australis	FACW	Herb.
5.		
6.		
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes __X__ No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes _____ No __X__ Gleyed? Yes _____ No __X__
Matrix Color: 10 YR 6/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes __X__ No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No __X__
Is the soil saturated? Yes _____ No __X__
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
Evidence of surface ponding (sediment deposits)
Is the wetland hydrology criterion met? Yes __X__ No _____
Rationale: Field indicators of wetland hydrology found at the site

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes __X__ No _____
Rationale for jurisdictional decision: All three criteria are met

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #35

Do normal environmental conditions exist at the plant community?
Yes _____ No __X__ (If no, explain) Edge of cleared area
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes __X__ No _____ (If yes, explain) Edge of cleared area

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Shrub
2. Liquidambar styriciflua	FAC	Shrub
3. Prunus serotina	FACU	Shrub
4. Hamamelis virginiana	FAC	Shrub
5. Prunus serotina	FACU	Herb.
6. Phragmites australis	FACW	Herb.
7. Smilax rotundifolia	FAC	Herb.
8. Rubus allegheniensis	FACU	Herb.
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 62%
Is the hydrophytic vegetation criterion met? Yes __X__ No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

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SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No __X__ Gleyed? Yes _____ No __X__
Matrix Color: 10 YR 3/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes __X__ No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No __X__
Is the soil saturated? Yes _____ No __X__
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.
Sediement deposits
Is the wetland hydrology criterion met? Yes __X__ No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes __X__ No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #36

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain) Edge of fill and roadway
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain) Edge of fill and roadway

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Shrub
2. Liquidambar styriciflua	FAC	Shrub
3. Prunus serotina	FACU	Shrub
4. Liquidambar styriciflua	FAC	Herb.
5. Prunus serotina	FACU	Herb.
6. Acer rubrum	FACW	Herb.
7. Smilax rotundifolia	FAC	Herb.
8. Poaceae sp.	N/A	Herb.
9. Aster spp.	N/A	Herb.
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 71%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wet

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SOILS

Series/phase: Sassafras-Galestown-Woodstown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes ___ No X Histic epipedon present? Yes ___ No ___
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: Unobtainable due to fill Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No X
Rationale: No field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all of the criteria met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #37

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Magnolia virginiana	FACW	Canopy
3. Hamamelis virginiana	FAC	Shrub
4. Hamamelis virginiana	FAC	Shrub
5. Smilax rotundifolia	FAC	Herb.
6. Woodwaridia aerolata	FACW	Herb.
7.		
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

---

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 2/1 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 4"
List other field evidence of surface inundation or soil saturation.
Buttressed trunks, surface roots, hummocky topography
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

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JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #38

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratu
1. Acer rubrum	FACW	Canop
2. Prunus serotina	FACU	Canopy
3. Acer rubrum	FACW	Shrub
4. Vaccinium corymbosum	FAC	Shrub
5. Hamamelis virginiana	FAC	Shrub
6. Osmunda regalis	OBL	Herb.
7. Smilax rotundifolia	FAC	Herb.
8.		
9.		
10.		

Percent of dominant species that are OBL, FACW, and/or FAC 86%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wett

---

SOILS

Series/phase: Freshwater Marsh Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No ___ Undetermined X
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No_
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 4/2 Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes X No _____
Rationale: Soils of low chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: 18"
List other field evidence of surface inundation or soil saturation.
Buttressed trunks, surface roots
Is the wetland hydrology criterion met? Yes X No _____
Rationale: Field indicators of wetland hydrology found at the site

---

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: All three criteria are met

---

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): John Ryder, Linda Taylor Date: Nov. 6, 1990
Project/Site: Nat. Smelting of N.J. State: NJ County: Salem
Applicant/Owner: Nat. Smelting of N.J. Plant Community #/Name: TS #39

Do normal environmental conditions exist at the plant community?
Yes X No _____ (If no, explain)
Has the vegetation, soil, and/or hydrology been significantly disturbed?
Yes _____ No X (If yes, explain)

VEGETATION

Dominant Plant Species	Status	Stratum
1. Acer rubrum	FACW	Canopy
2. Liquidambar styriciflua	FAC	Canopy
3. Prunus serotina	FACU	Canopy
4. Liquidambar styriciflua	FAC	Shrub
5. Prunus serotina	FACU	Shrub
6. Hamamelis virginiana	FAC	Shrub
7. Prunus serotina	FACU	Shrub
8. Acer rubrum	FACW	Shrub
9. Vaccinium corymbosum	FAC	Shrub
10. Quercus rubra	FACU	Canopy
11. Quercus rubra	FACU	Canopy

Percent of dominant species that are OBL, FACW, and/or FAC 86%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: Greater than 50% of the vegetation is facultative or wetter

---

SOILS

Series/phase: Sassafras-Galestown-Woodstown Subgroup: _____
Is the soil on the hydric soil list? Yes ___ No X Undetermined ___
Is the soil a Histosol? Yes__ No X Histic epipedon present? Yes__ No X
Is the soil: Mottled? Yes _____ No X Gleyed? Yes _____ No X
Matrix Color: 10 YR 5/8 Mottle Colors: _____
Other hydric soil indicators: None found
Is the hydric soil criterion met? Yes _____ No X
Rationale: Soils of high chroma exist at the site

HYDROLOGY

Is the ground surface inundated? Yes _____ No X
Is the soil saturated? Yes _____ No X
Depth to free-standing water in pit/soil probe hole: N/A
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No X
Rationale: Field indicators of wetland hydrology not found at the site

---

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No X
Rationale for jurisdictional decision: Not all of the criteria met

---

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 54386

DOC TITLE/SUBJECT:

SITE SPECIFIC
WETLAND DELINEATION LOCATION MAP
EXHIBIT E
REMEDIAL INVESTIGATION REPORT
NSNJ INC / NL SITE
SHEET 2 OF 2

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DOC ID # 54386

DOC TITLE/SUBJECT:

SITE AND ADJACENT AREA WETLAND
DELINEATION LOCATION MAP
AERIAL PHOTOGRAPH

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SHEET 1 OF 1

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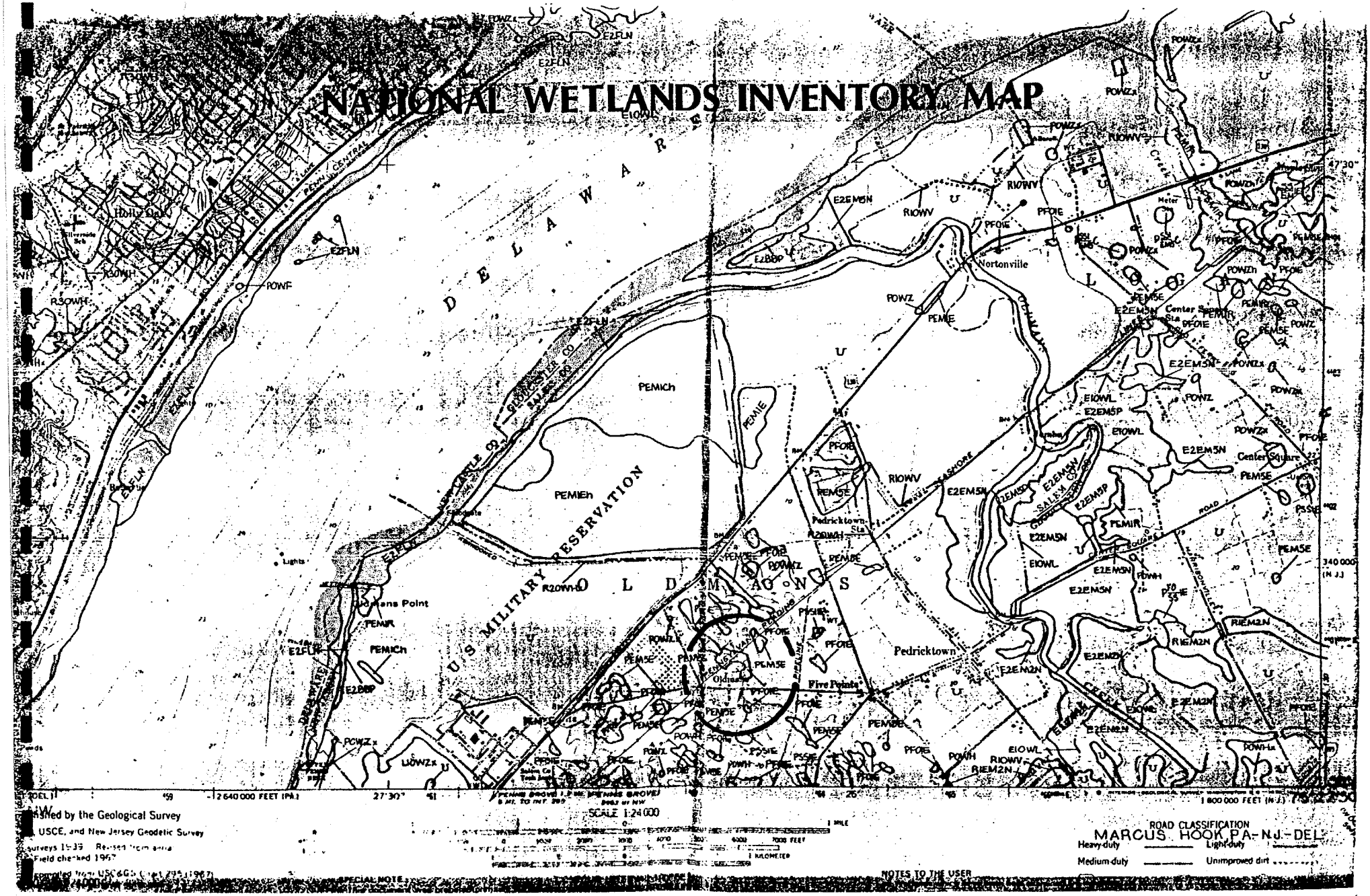
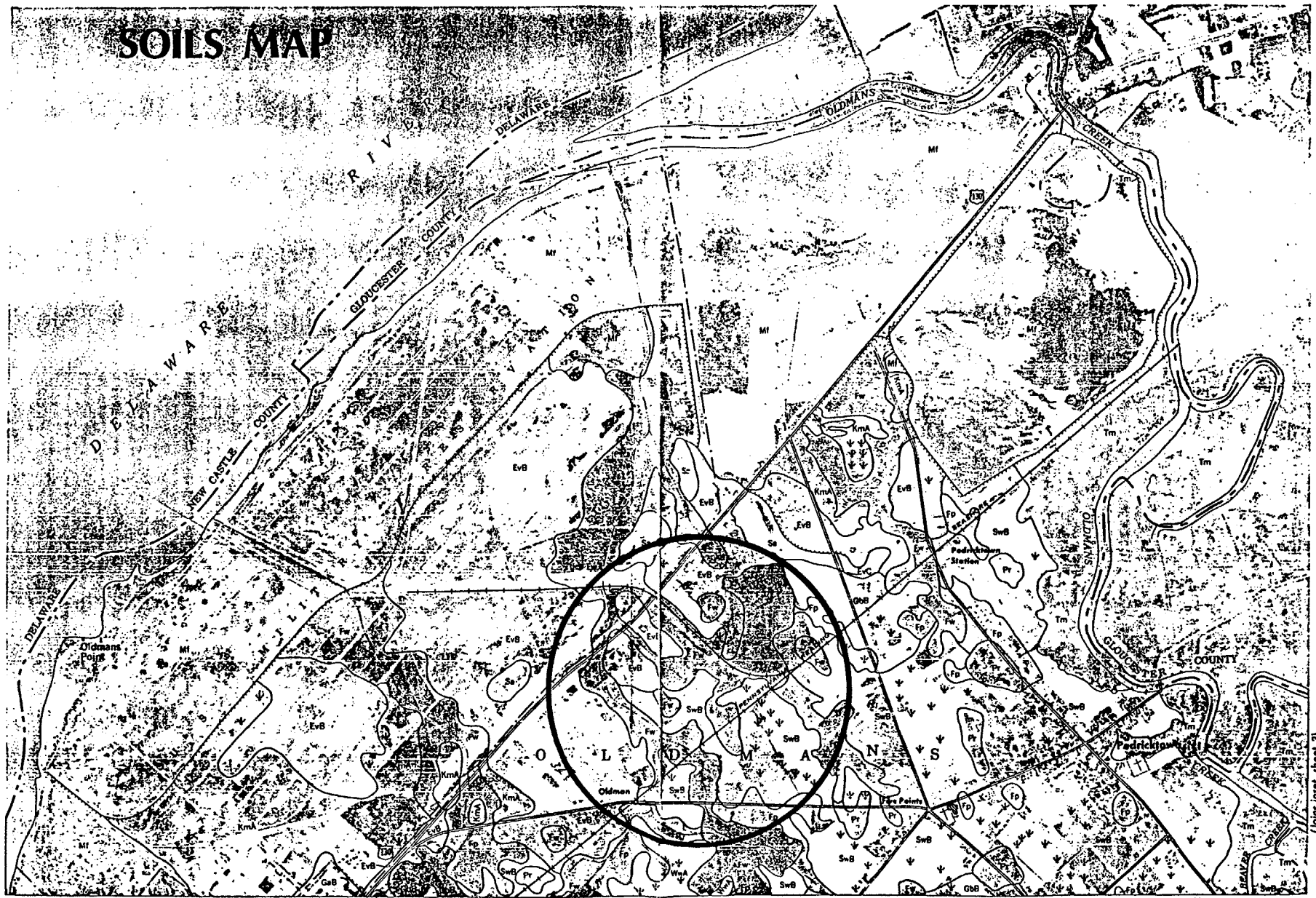
NATIONAL WETLANDS INVENTORY MAP



NLI 001 2261

SOILS MAP



APPENDIX S
NSNJ/NL SITE
ECOLOGICAL ASSESSMENT

TABLE OF CONTENTS

SECTION 1 - OBJECTIVES

1.01 Overview

The National Smelting of New Jersey (NSNJ/NL) Site is the location of a former secondary lead smelting facility and is situated within an industrial park in Pedricktown, New Jersey. The area surrounding the industrial park is predominantly rural in nature, characterized by agricultural and residential land uses. Smaller areas of woods occur in association with streams and wetlands in the vicinity of the site.

This ecological assessment was limited to the designated study area shown in Figure S-1. The study area was selected based on land uses surrounding the site and the availability of environmental data. Supplemental studies being conducted during December 1990 will provide data necessary to evaluate ecological effects downstream (north) of U.S. Route 130. The study area is approximately 370 acres in area and is enclosed by U.S. Route 130 to the north, Porcupine Road to the east, Pedricktown Road to the south and Benjamin Green Road to the west.

1.02 Objectives

This ecological assessment was performed with the following objectives:

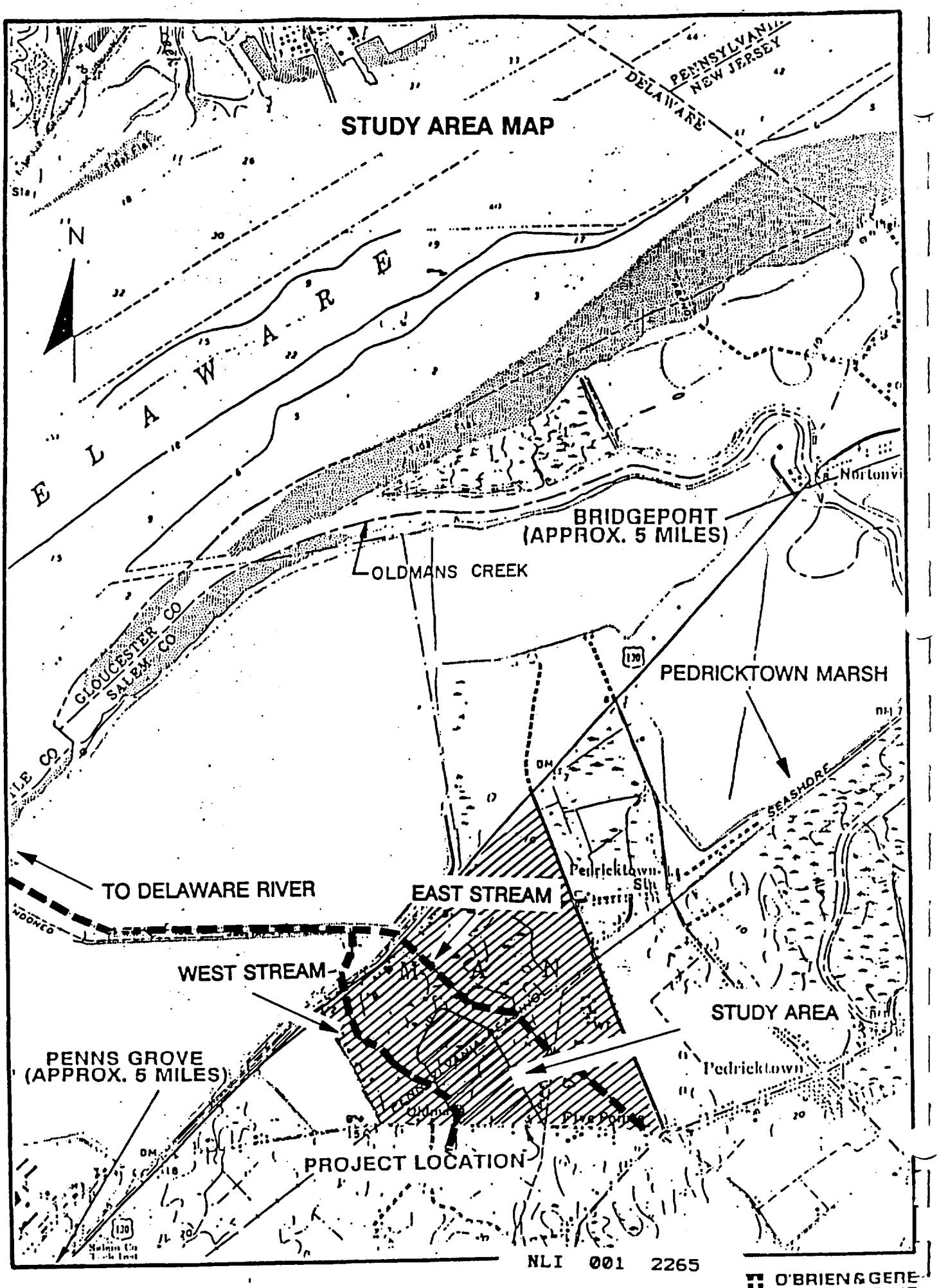
1) Characterizing the ecology of site and its surroundings (the study area).
2) Identifying source areas of site-related residues, potential pathways for exposure, and potential ecological receptors.
3) Evaluating the significance of potentially exposed ecosystems or populations (i.e. regulated wetlands, endangered and threatened species, protected streams, etc.).
4) Assessing the risk to potentially exposed populations of plants and animals.

This ecological assessment is intended to provide a quantitative evaluation of the actual or potential impacts of lead residues associated with the site to plants and animals on and surrounding the site. In cases where quantitative conclusions were not tenable, some qualitative interpretations regarding these same impacts were made.

The above information will be used to provide a basis for decision making with respect to remediation at the site. The assessment is concluded with a summarization of the risk to ecological resources on and surrounding the site based on the information gathered in the steps above.

This ecological assessment was prepared using guidance from the USEPA [1989], and in accordance with the requirements of CERCLA. The organization of the report, as put forth by the USEPA [1989] is as follows:

FIGURE S-1



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Section 1 - Objectives
Section 2 - Definition of the Scope
Section 3 - Description of the Study Area
Section 4 - Description of Contaminants of Concern
Section 5 - Exposure Characterization
Section 6 - Risk or Threat Characterization
Section 7 - Conclusions and Limitations of Analysis

SECTION 2 - DEFINITION OF THE SCOPE

2.01 Purpose

This purpose of this section is to describe the methods used in the assessment. Included, for each effort performed in the assessment, is a discussion of the resources and the methods of analysis used for each effort. The kind and amount of information collected and interpreted as part of this assessment are discussed. Spatial and temporal boundaries to data are addressed.

2.02 Land Use Analysis and Selection of the Study Area

Land use patterns within 1/2 mile of the site were inspected using aerial photographs taken in 1980 and 1984 (See Exhibit G of the Remedial Investigation (RI) [O'Brien & Gere, 1990] for 1984 photograph). The scales of the photographs were 1":400' and 1":300,' respectively. Land uses and ecological "covertypes" (see Section 2.01.01) were identified based on this remote characterization. In an effort to determine where actual land uses and covertypes differed from the interpretations made from the aerial photographs, a limited field reconnaissance was conducted. The field reconnaissance consisted of an inspection of land uses and covertypes made from an automobile along roadways within the 1/2 mile radius of the Site.

A study area for the assessment was defined based on the characterization of the site surroundings described above, and the concentrations of lead detected during the remedial investigation [O'Brien & Gere, 1990]. The study area was selected so as to best represent land uses and covertypes surrounding the site. The study area is approximately 370 acres in area and includes forest areas, wetlands, fields, farmland, residences and industry (See Figure S-2).

2.03 Ecological Characterization

Covertype Analysis:

The development of the ecological characterization consisted of categorizing distinct ecological communities present within the study area into "covertype" designations. A covertype, for the purposes of this assessment, is described as a category of land use defined by the composition of its vegetation or its characteristic physical features (i.e. buildings, lots, etc.). Covertypes for forested areas included in this analysis were classified according to Sutton and Sutton [1988] and Sheay [1989]. Sutton and Sutton provide general classifications for forest types found in the eastern United States. Sheay has developed three major and three minor forest types for the State of New Jersey. In each case the ascribed forest covertype designation is based on a best-fit between the species' identified on the site and those included in the covertype description. Non-forest covertypes were classified based on the dominant physical or vegetative characteristic of the covertype.

Covertype designations (Figure S-2) were determined from dominant ground features evident in the 1980 aerial photograph (1"=400') of the site and its surroundings. Features identified in the photograph included hardwood and conifer tree stands, buildings, parking lots, roads, meadows, and streams.

A field reconnaissance was conducted on November 1, 1990 to confirm and further define the

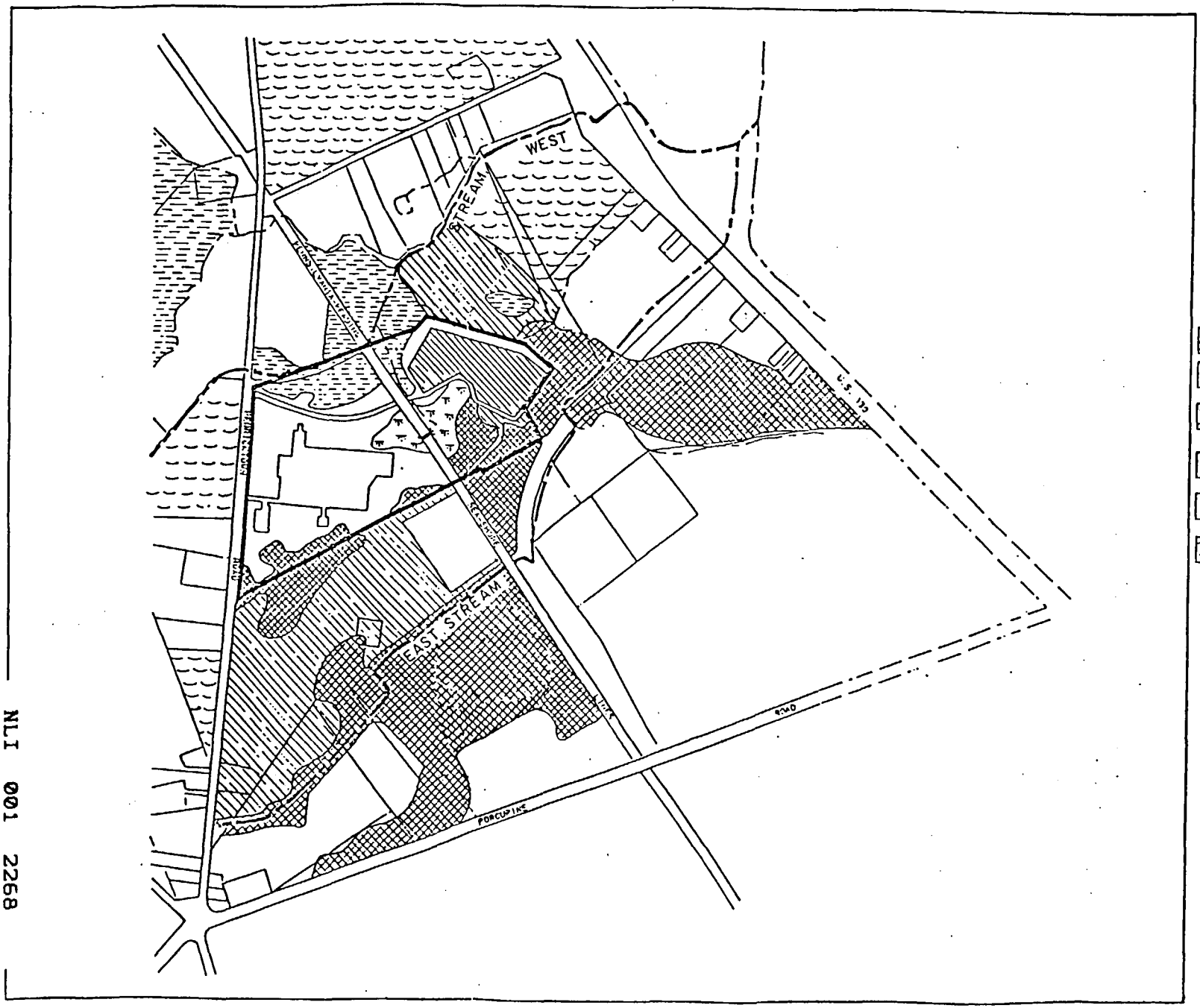

FIGURE S-2
NSNJ INC. / NL SITE
FREDRICKTOWN, NEW JERSEY

LEGEND

- GRASS FIELD
- MIXED DECIDUOUS FOREST
- ELM, ASH, RED MAPLE FOREST
- INDUSTRIAL / RESIDENTIAL W/LAWNS, ETC.
- PHRAGMITES WETLAND
- CULTIVATED FIELD

COVERTYPE MAP

600 0 600
SCALE IN FEET

2844.014.114

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NLI 001 2268

remote characterization of the site developed from the aerial photograph. Forested areas, in particular, were examined to identify characteristic tree and shrub species. Fields, streams and wetlands were examined for dominant plant species. These areas were also inspected during daylight hours for evidence of wildlife activity (i.e. visual sightings, tracks, droppings, etc.) and evidence that would suggest the viability of wildlife organisms.

Wildlife Habitat Analysis

A list of potential wildlife species inhabiting the study area was developed based on the vegetative communities according to Sutton and Sutton [1988]. The guide to eastern forests authored by Sutton and Sutton provides guides to wildlife associated with different covertype classifications for the eastern U.S. The species identified according to Sutton and Sutton as potentially inhabiting the site were then examined with respect to habitat needs according to the *Complete Field Guide to North American Wildlife* [Collins, 1981]. The *Complete Field Guide to North American Wildlife* provides feed and habitat requirements for North American wildlife. These requirements were compared with resources found on the site to determine if the site is adequate to support the wildlife identified above through Sutton and Sutton [1988]. For purposes of the analysis, it was assumed that terrestrial wildlife potentially inhabiting the site on either a transient or resident basis would be associated with the mixed deciduous woodland areas, the red maple woodland areas or the wetlands on and surrounding the site. It is apparent that these areas present the greatest potential for supporting significant wildlife populations.

Potentially significant wildlife species' inhabiting the study area are those that are classified as endangered, threatened, or rare. The New Jersey Natural Heritage Program has compiled a data base for endangered species in the State of New Jersey. In order to determine if endangered species have been identified in the vicinity of the site, the Natural Heritage Program was contacted for information regarding endangered species known to occur in the vicinity of the site.

Wetland Delineation

A wetland delineation was performed by Talbot & Associates, Ltd. using U.S. Army Corps of Engineers criteria. The delineation was performed on a portion of the study area. The wetland delineation includes a section detailing assessment procedures and is included as Appendix R to the RI Report.

2.04 Characterization of Lead Residues

Lead concentrations were determined through sampling and analyses of soils, groundwater, surface water, and sediment throughout the study area. These sampling efforts are summarized in Section 2 of the RI and are briefly discussed below.

2.04.01 Soils

A total of 82 soil samples were collected on September 12, 1988 for lead analysis from locations both on and off-site (Figure 6 of the RI). The soil sampling plan is summarized in Section 2.04 of the RI Report. Samples were retrieved from a depth of 0-2" at eight locations where stormwater ponds near the railroad tracks on-site. At the remaining sample locations, areal composite samples (3 meter radius) were retrieved from depths of 0-3," 3-6," 6-12," and 12-18," and analyzed for total

lead. In cases where the composite from the 3-6" strata contained lead concentrations greater than 200 mg/kg the composites from the deeper stratum were analyzed.

2.04.02 Surface Water

Two unnamed channelized streams are located in close proximity to the site, the "East Stream" and the "West Stream" (See Figure S-1). Both streams are tributaries to the Delaware River, located approximately 1.5 miles northwest of the site (Figure S-1). A portion of the West Stream is located on the site. Surface water and groundwater flow from the site is toward the West Stream. No hydraulic connection exists between the East Stream and waters emanating from the manufacturing area of the site on the southern portion [O'Brien & Gere, 1990]. However, airborne residues emanating from the site in the past may have contributed to water quality in the East Stream [O'Brien & Gere, 1990].

Surface water sampling was conducted on both the East and West Streams in 1988 and again in 1989. The most recent samples collected on October 17, 1989, were analyzed for pH, specific conductivity, total lead, sulfate, and chloride. Results of total lead analyses for 1989 are summarized in Figure S-3. A complete data listing is provided in Tables 8 and 9 of the RI Report.

2.04.03 Sediment

Sediment samples were collected from the East and West Streams in 1988 and 1989 as shown in Figures S-4 and S-5, respectively. In 1988, the samples were taken from the top one inch of sediment at each location. In 1989 sediment cores were collected and analyzed to a depth of 12 inches with sections of 0-3", 3-6", and 6-12" analyzed. Samples were analyzed for total lead.

Data from sediment samples (0-1") collected in 1988 and from the top three inches of samples collected in 1989 will be evaluated for this assessment. The discussion is limited to the top three inches because the top stratum of sediment is most available to aquatic organisms.

2.05 Exposure Characterization

The exposure characterization consisted of the following steps:

1) Potential ecological receptors were identified based on the wildlife habitat assessment and the covertype analysis. Potentially significant receptors (i.e. endangered species) were also identified in the wildlife habitat analysis.

2) Because the lead has been detected on the site, an analysis of transport medium was then conducted. The media examined on the site for the presence of lead contamination included soil, surface water, groundwater, sediment and air.

3) Based on the potential receptors and the transport media identified, points of potential contact between the exposed medium and the potential receptor population were identified. For example, because lead was detected in surface water, the habits of terrestrial and aquatic organisms were examined in order to determine the potential for these organisms to contact this medium.

4) Finally, where it was determined that a point of contact existed between receptor and media in which lead was detected, exposure routes between receptors and lead residues were examined. Potential exposure routes include ingestion, inhalation, direct contact, and foodchain exposures.

2.06 Risk or Threat Characterization

2.06.01 Characterization of Effects

Probability of Effects:

Based on the Exposure Characterization outlined above, potential effects were examined with respect to receptors potentially found on the site. A qualitative discussion of each potential exposure pathway is provided. Potential receptor populations were then addressed with respect to population size and significance.

Measurable assessment endpoints were selected and analyzed, where possible, in order to quantitatively evaluate the magnitude of potential effects posed by the site. Measurable assessment endpoints exist for two of the pathways identified. The two pathways were addressed in the *Magnitude of Effects* section.

Magnitude of Effects:

In order to evaluate the potential magnitude of effects posed by site related residues, measurable assessment endpoints were selected. The assessment endpoints were selected based on sensitive indicators (aquatic and benthic organisms). The indicators were evaluated using ambient water quality criteria and NOAA toxicity evaluations [NOAA, 1990].

Lead concentrations in the surface water were compared with USEPA Ambient Water Quality Criteria in order to determine the significance of those concentrations (USEPA, 1987). Lead concentrations in exceedance of water quality criteria were considered to be of ecological significance.

The National Oceanic and Atmospheric Administration [NOAA, 1990] annually collects and chemically analyzes sediment samples from sites located in coastal marine and estuarine environments. Biological effects associated with different concentrations have been compiled. From this list of effects, an Effects Range-Low (the lower 10 percentile in the data) and an Effects Range-Median (the median of the data) have been identified. In addition, NOAA has also suggested concentrations at which lead in sediments (300 mg/kg) has been consistently observed to have adverse effects on benthic organisms. These values are used as indicators as to the potential for adverse biological effects at a given site based on chemical data. Although the effects were developed using data from marine and estuarine systems only, the Study states that it can be

expected that effects to freshwater organisms are greater than those associated with the marine and estuarine systems. Therefore, the NOAA study was used as a conservative indicator of freshwater impacts as a result of lead in sediments.

2.06.02 Applicable or Relevant and Appropriate Requirements (ARARs)

Chemical and location specific ARARs specifically applicable to ecological resources were evaluated with respect to measurable site characteristics to determine where ARARs are exceeded. The ARARs that are applicable to the site with respect to ecological resources are the *Clean Water Act* and the *Endangered Species Act*.

SECTION 3 - DESCRIPTION OF THE STUDY AREA

3.01 Site Location and History

The site consists of a former secondary lead smelting facility constructed in 1971. The study area comprises approximately 380 acres divided into a northern and a southern section by railroad tracks (Figure S-2). The site is located in an industrial park bounded by Pennsgrove-Pedricktown Road to the South, U.S. Route 130 to the north, Porcupine Road to the east, and Benjamin Green Road to the west.

The secondary lead smelter on the site began operation in 1972 to recycle automobile batteries. A synopsis of the recycling process is contained in Section 1.03 of the RI report. A RCRA landfill containing process waste and soils from the site occupies the northern portion of the site. (A description of the former process and of the landfill is contained in Section 1.03 of the RI Report.).

The topography on the Study Area and the surrounding area is generally relatively flat. The only area within the study area of steep relief is the area of the closed RCRA landfill in the northern portion of the site.

3.02 Land Use Analysis

As discussed in Section 3.01, the site was formerly the site of a secondary lead smelting facility used for the recycling of batteries and other recyclable products. The facility is now abandoned. A trailer remains on-site as a base for site landfill operation. The study area includes the industrial park comprising the operations of Airco, B.F. Goodrich, Browning-Ferris Industries, Exxon, and several other companies [O'Brien & Gere, 1990], as well as residential, and agricultural land uses.

Land uses immediately surrounding the study area consist of commercial, agricultural, residential sites as well as a military reservation. Between the study area and the Delaware River, north of the site, is a military base and an Army Corps of Engineers Dredge Spoil area. A wetland game management site, the Pedricktown Marsh, is located approximately one mile east of the site. The location of the Marsh is shown in Figure S-1. A small natural gas delivering facility is directly across Pedricktown-Pennsgrove Road from the facility.

3.03 Covertype Analysis

The land area encompassed by the study area boundaries can be characterized by seven different covertype designations. Figure S-2 illustrates the arrangement of covertypes within the study area. Terrestrial or aquatic wildlife are associated with several of the covertypes identified. The flora and fauna that make up these covertypes comprise a distinct ecological community.

3.03.01 Covertypes:

- *Mixed Deciduous Forest*: Mixed deciduous forest is the predominant forest covertype in the study area. It surrounds the site to the north and east (See Figure S-2). This covertype comprises approximately 17% (61 acres) of the study area. Descriptions provided by Sheay [1990] are not applicable to this forest type. Sutton and Sutton [1988] describe this forest type as a widespread forest type in the eastern United States. This covertype is a mixed-age stand characterized by some mature to old-growth as well as seedling and sapling sized sweetgum individuals. Sweetgum trees are the dominant tree species in this community. In addition to sweetgum trees, the understory consists of black cherry trees as well as shade tolerant tree species such as sugar maple. Along roadways, the railroad, and the right-of-way, extensive sunlight intrusion to the forest floor has resulted in the presence of dense thorn bushes and other shade intolerant plants not typically encountered in a stand of this type. Table I, below is a list of tree species associated with this covertype.

Table I: Dominant tree species' in the Mixed Deciduous Forest.

Common Name:	Scientific Name:
Sweetgum	*Liquidambar styraciflua*
Black Cherry	*Prunus serotina*
Witch-hazel	*Hamamelis virginiana*
Sugar Maple	*Acer saccharum*
White Oak	*Quercus alba*
Sassafras	*Sassafras albidum*
Tree-of-Heaven	*Ailanthus altissima*

- *Elm-Ash-Red Maple Forest*: The ecological community associated with the West Stream (Figure S-2), is a mixed-age stand. This forest type designation is categorized by Sheay [1990] as a minor forest type in the State of New Jersey. The dominant tree species are mature, pole-size red maple. Shade-tolerant wet soil species such as witch-hazel make up the understory of this community. This community has been included in the area delineated as a wetland (see Wetland Delineation, Appendix R). This community makes up approximately 4% (13 acres) of the study area.

Table II: Dominant tree species' in the Elm-Ash-Red Maple Forest

Common Name:	Scientific Name:
Red Maple	*Acer rubrum*
Sugar Maple	*Acer saccharum*
Witch-hazel	*Hamemelis virginiana*
Common Reed-grass	*Phragmites phragmites*

- *Grass Field*: The land area at the top of the RCRA landfill and the large grassy field that occurs beyond the sweetgum forest to the east of the site are best characterized as grass field. Vegetation is made up of wild grasses and flowers sparsely covering a rocky, sandy ground surface. The area comprises approximately 9% (35 acres) of the study area.

- *Phragmites Wetland*: The marsh area close to the center of the site, straddling the railway, and extending off-site, is a wetland. Vegetation in this wetland is predominantly made up of Common Reed Grass (*Phragmites phragmites*), a common wetland plant. This covertype covers approximately 3% (10 acres) of the study area.

- *Cultivated Field*: A parcel of land located west of the site, adjoining Route 130 is classified as cultivated field. The land is used for vegetable production. This covertype makes up 5% (18 acres) of the study area. Land cultivated for crop production also occurs across Pedricktown Road to the south and southwest.

- *Industrial/Residential with lawns, etc.*: The portions of the study area not characterized by a vegetative or aquatic covertype are made up of unvegetated ground cover and mowed lawns. These areas represent approximately 63% (233 acres) of the study area and include the rocky embankment surrounding the landfill, the railroad, the dirt road providing access to the site, the abandoned smelting facility as well as the Exxon facility to the northeast and the residential and commercial land uses to the west.

- *Stream*: This covertype consists of the channelized East and West Streams, both tributaries to the Delaware River. The Streams are classified as FW2 - NT/SE1 by the State of New Jersey [NJDEP, 1989] by virtue of their status as tributaries of the Delaware River.

3.03.02 Terrestrial Wildlife Resources

Wildlife observed during the site reconnaissance included one red-tailed hawk sighted above the eastern portion of the site and a number of mourning doves seen throughout the site. White-tailed deer tracks were also observed on the eastern portion of the site.

Based on the nature of the cover and feed available for the covertypes in the study area, and the extent of these covertypes, general lists of potential wildlife inhabitants of the study area have been developed from wildlife references of the eastern United States [Sutton and Sutton, 1988; Collins, 1981]. Table III is a list of reptilian and amphibian species potentially utilizing the identified covertypes. Table IV and V are lists, respectively, of mammals and birds potentially utilizing existing covertypes.

The wildlife identified on the site during the field reconnaissance are consistent with the species listed in Tables IV and V as potentially inhabiting the site.

Table III: Reptiles and Amphibians Typically Found in Mixed-Deciduous Forest/Wetland

Common Name:	Scientific Name:
Painted Turtle	*Thamnophis sirtalis*
Eastern Box Turtle	*Terrapene carolina*
Garter Snake	*Eumeces fasciatus*
Five Lined Skink	*Lampropeltis triangulum*
Milk Snake	*Chrysemys picta*
Racer	*Coluber constrictor*
Rat Snake	*Elaphe obsoleta*
Timber Rattlesnake	*Crotalus horridus*
Wood Turtle	*Clemmys insculpta*
American Toad	*Bufo americanus*
Gray Treefrog	*Hyla versicolor*
Eastern Newt	*N. viridescens*
Fowler's Toad	*Bufo woodhousei folweri*
Pickerel Frog	*Rana palustris*
S'thern Leopard Frog	*Rana sphenocephala*
Spring Peeper	*Hyla crucifer*
Tiger Salamander	*Ambystoma tigrinum*

Table IV: Mammals Typically Inhabiting Mixed-Deciduous Forest/Wetland

Common Name:	Scientific Name:
Beaver	*Castor canadensis*
Cotton Mouse	*Peromyscus gossypinus*
Deer Mouse	*Peromyscus maniculatus*
Eastern Cottontail	*Sylvilagus floridanus*
Fox Squirrel	*Sciurus niger*
Gray Fox	*U. cinereoargenteus*
Gray Squirrel	*Sciurus carolinensis*
Long-Tailed Weasel	*Mustela frenata*
New Eng. Cottontail	*Sylvilagus transitionalis*
Raccoon	*Procyon lotor*
Red Fox	*Vulpes vulpes*
Short-Tailed Shrew	*Blarina brevicauda*
S'thrn Flying Squirrel	*Glaucomys volans*
Striped Skunk	*Mephitis mephitis*
Virginia Opossum	*Didelphis virginiana*
White-Footed Mouse	*Peromyscus leucopus*

Table V: Birds Typically Inhabiting a Mixed-Deciduous Forest/Wetland

Common Name:	Scientific Name:
American Robin	*Turdus migratorius*
American Woodcock	*Scolopax minor*
Barred Owl	*Strix varia*
Blue-gray gnatcatcher	*Polioptila caerula*
Blue Jay	*Cyanocitta cristata*
Broad-winged Hawk	*Buteo platypterus*
Brown Thrasher	*Toxostoma rufum*
Cardinal	*Cardinalis cardinalis*
Cedar Waxwing	*Bombycilla cedorum*
Common Crow	*Corvus brachyrhynchos*
Cooper's Hawk	*Accipiter cooperii*
Downy Woodpecker	*Picoides pubescens*
Hooded Warbler	*Wilsonia citrina*
Kentucky Warbler	*Oporornis formusus*
Mourning Dove	*Zenaida macroura*
Northern Parula	*Parula americana*
Pileated Woodpecker	*Dryocopus pileatus*
Red-eyed Vireo	*Vireo olivaceus*
Red-shoulderedHawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
White-eyed Vireo	*Vireo griseus*

3.03.03 Aquatic wildlife

Aquatic organisms in the study area, if present, are associated with the channelized West Stream and the East Stream. The portion of the West Stream that is contiguous with the site is occupied by dense emergent vegetation. This portion of the stream was observed during the site reconnaissance to have low flow. Surface flow in this portion of the stream may cease altogether during periods of high evapo-transpiration or low rainfall. Consequently, this portion of the stream is not viable as a habitat for fish populations. Downstream of the site, the West Stream is continuous, but murky. It appears that this stream does not represent a habitat for fish species such as trout. The stream may support populations of bullheads, catfish or carp provided other water quality parameters such as pH and dissolved oxygen are acceptable.

The East Stream is also a tributary of the Delaware River. The East Stream is a perennial stream where it nears the site and below. Like the West Stream, the nature of the water in the East Stream appears to make it most suitable to fish species such as bullheads and catfish.

3.04 Readily Observed Effects

At the time of the site reconnaissance on November 1, 1990, there were no effects to the ecology potentially attributable to site residues observed outside of the site boundaries (see Figure S-2). Within the site boundaries, readily observed effects could not be determined due to construction activities over the past two decades.

SECTION 4 - DESCRIPTION OF CONTAMINANTS OF CONCERN

4.01 General

Analyses conducted during the RI focused on the presence of lead in the study area because the facility was a secondary lead smelter. Although other materials have been identified in soil and sediment samples, lead is generally at higher concentrations. Comparing observed concentrations of substances in the water and sediments with ambient water quality criteria indicates that lead concentrations are most likely to be of environmental significance. This description is limited to an evaluation of the ecological effects of lead.

4.02 Soils

Figure 8 of the RI Report illustrates the sample locations. The range for lead results is from 2.91 to 12700 mg/kg on-site, and 10.7 to an anomalous 1770 mg/kg in off-site soils. A complete data listing for on-site soils is presented in Table 12 of the RI. Table 13 presents a complete data listing for soil concentrations from samples taken at off-site locations. A statewide geometric mean of 12.26 mg/kg was provided by NJDEP with a standard deviation for the geometric mean of 15.51 mg/kg [Fields, 1990]. Lead concentrations in soil samples collected at the perimeter of the sampling area are within background levels (Statewide geometric mean $\pm$ two standard deviations). Figure S-3 depicts the locations of soil samples and denotes which samples exceed background levels.

4.03 Surface Water

Data from the 1988 sampling effort, as shown in Table 8 of the RI Report, show elevated lead concentrations in surface water on the site. The highest lead concentrations occur where the West Stream crosses the site and in the ponded stormwater on the site situated adjacent to the railroad tracks. The lowest lead concentrations were found upstream of the site.

As shown in Figure S-3, data from the 1989 sampling event (Table 9 of the RI) again indicate elevated lead concentrations in surface water on the site. Except for one approximated (See Table 9) result upstream of the site, the data show lower lead concentrations upstream in comparison with lead concentrations in samples taken downstream.

The range in lead concentrations detected in the 17 samples collected from the West Stream and analyzed in 1989 was from 0.0488 to 2.2000 mg/l with a mean of 0.446 mg/l. Results from the analysis of the two samples collected and analyzed from the East Stream in 1989 were 0.010 and 0.101 mg/l lead.

4.04 Sediment

Data from the sediment sampling and analysis have demonstrated the presence of lead residues in the sediments of the West Stream (See Table 9 of the RI). Figures S-4 and S-5 illustrate surface sediment concentrations for lead. For sediment samples collected in 1989, the geometric mean for East Stream lead concentrations in the top three inches of sediment is 110 mg/kg. The geometric mean for the West Stream is 1400 mg/kg.

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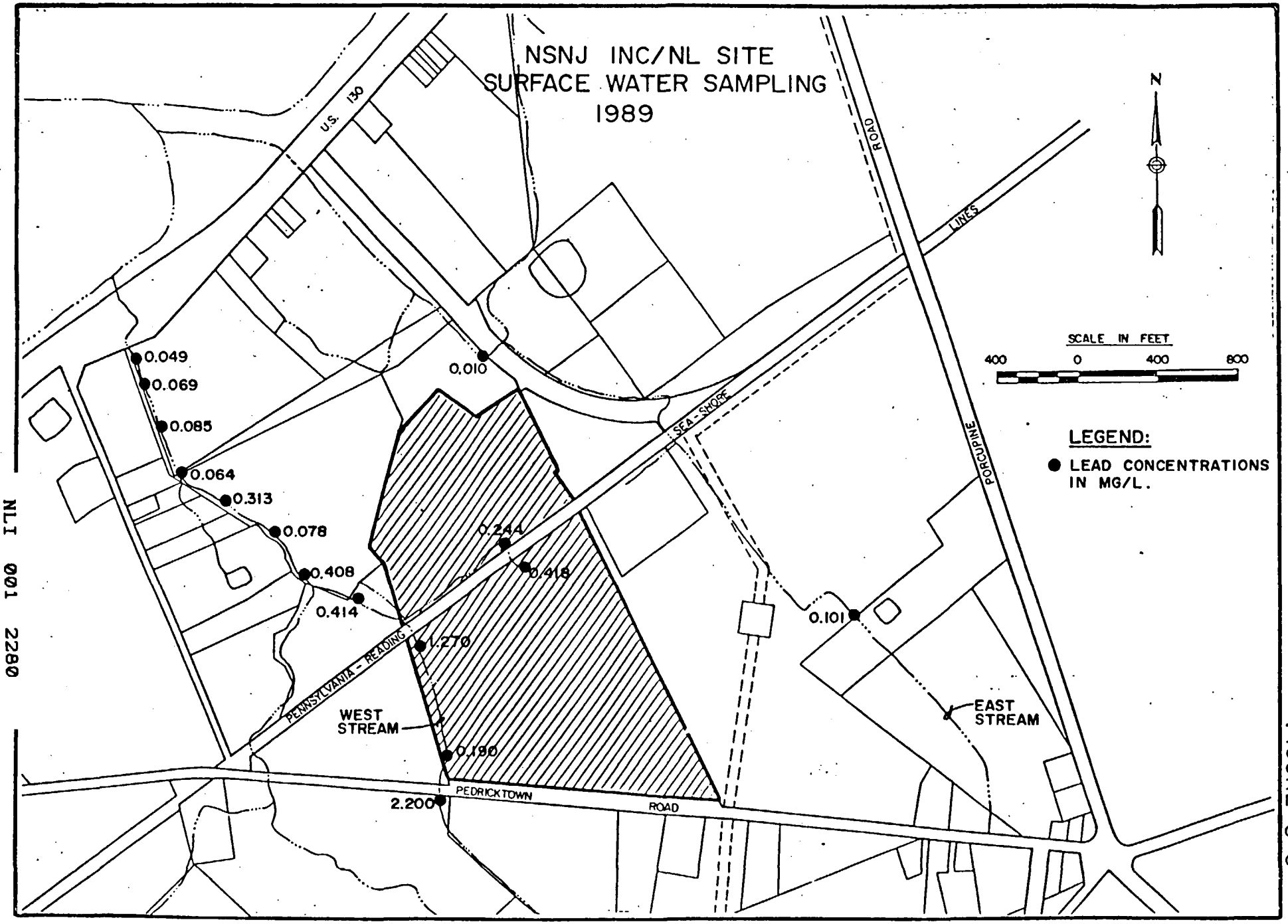

FIGURE S-3

NLI 001 2280

O'BRIEN&GERE ENGINEERS, INC.

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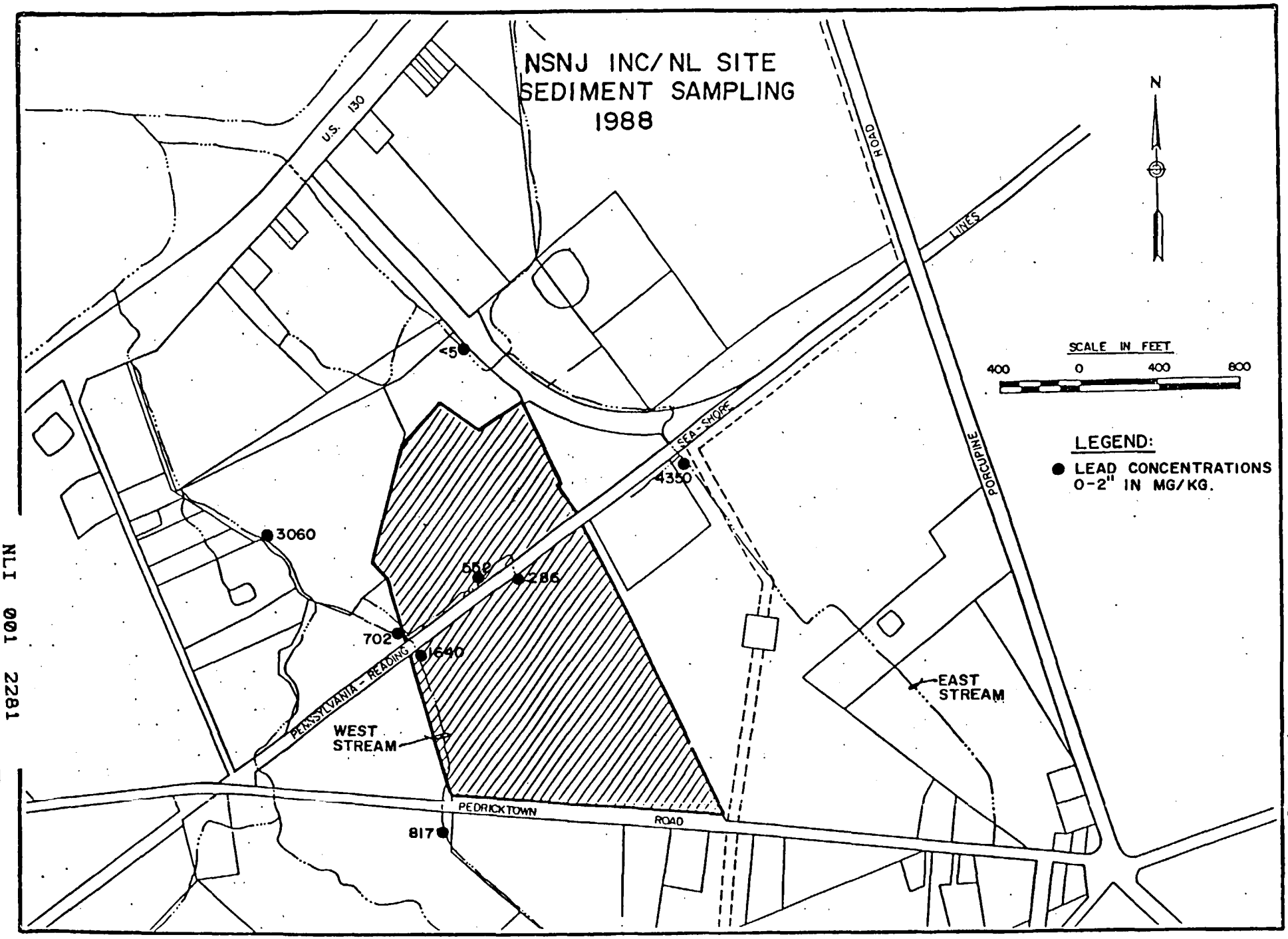

FIGURE S-4

NLI 001 2281

O'BRIEN&GERE ENGINEERS, INC.

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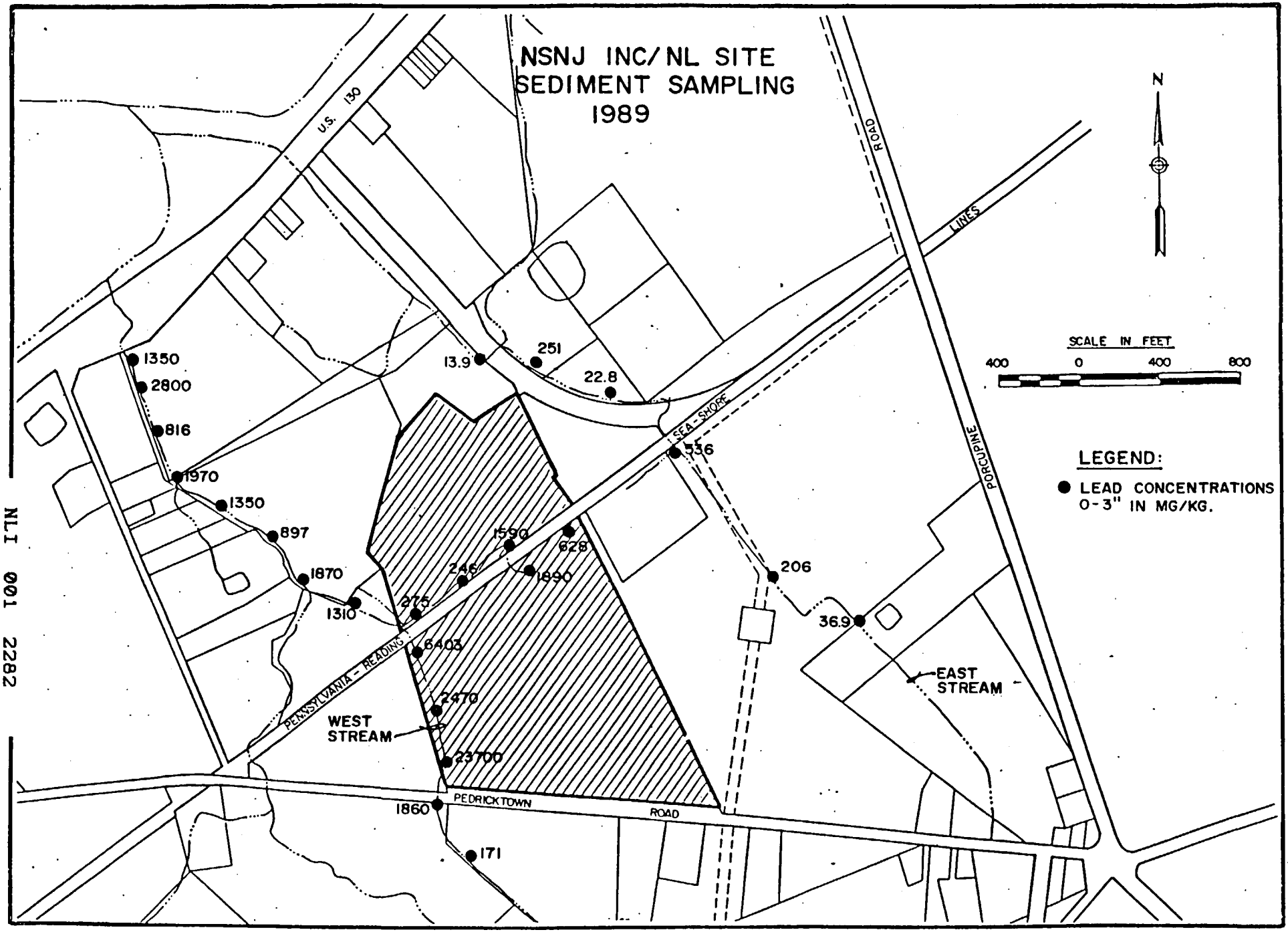


FIGURE S-5

NLI 001 2282

O'BRIEN&GERE ENGINEERS, INC.

SECTION 5 - EXPOSURE CHARACTERIZATION

5.01 Exposure Pathway Analysis

5.01.01 Release Sources, Release Mechanisms and Transport Media

The release sources, release mechanisms, and receiving media for the environmental assessment are the same as those identified in the human health evaluation (see Table 27, RI Report). Release sources are lead wastes within the former facility, soils containing lead residues, groundwater containing lead residues, surface water containing lead residues and lead in stream sediments. Release mechanisms consist of fugitive dust, surface runoff, groundwater seepage, leaching, and uptake by biota. Receiving media are air, surface water, groundwater, soil and sediment as shown in Figure S-6.

5.01.02 Receptors

Potential exposure points consist of terrestrial, aquatic, and wetland communities associated with covertypes identified within the study area. No endangered or rare species have been identified within the study area.

Terrestrial Communities:

Based on the covertype analysis, it was determined that the mixed deciduous forest and the elm-ash-red maple forest represent the most viable resources within the study area to support diverse terrestrial wildlife. Based on the characteristics of these forested areas terrestrial organisms were identified in Section 3.03 as potentially inhabiting the site. These organisms represent potential receptors of lead residues from the site.

Aquatic Communities:

As for the terrestrial communities above, those organisms inhabiting the streams in the study area are potential receptors of lead residues from the site. Fish, if present in either of these streams, and bottom dwelling organisms would be likely receptors.

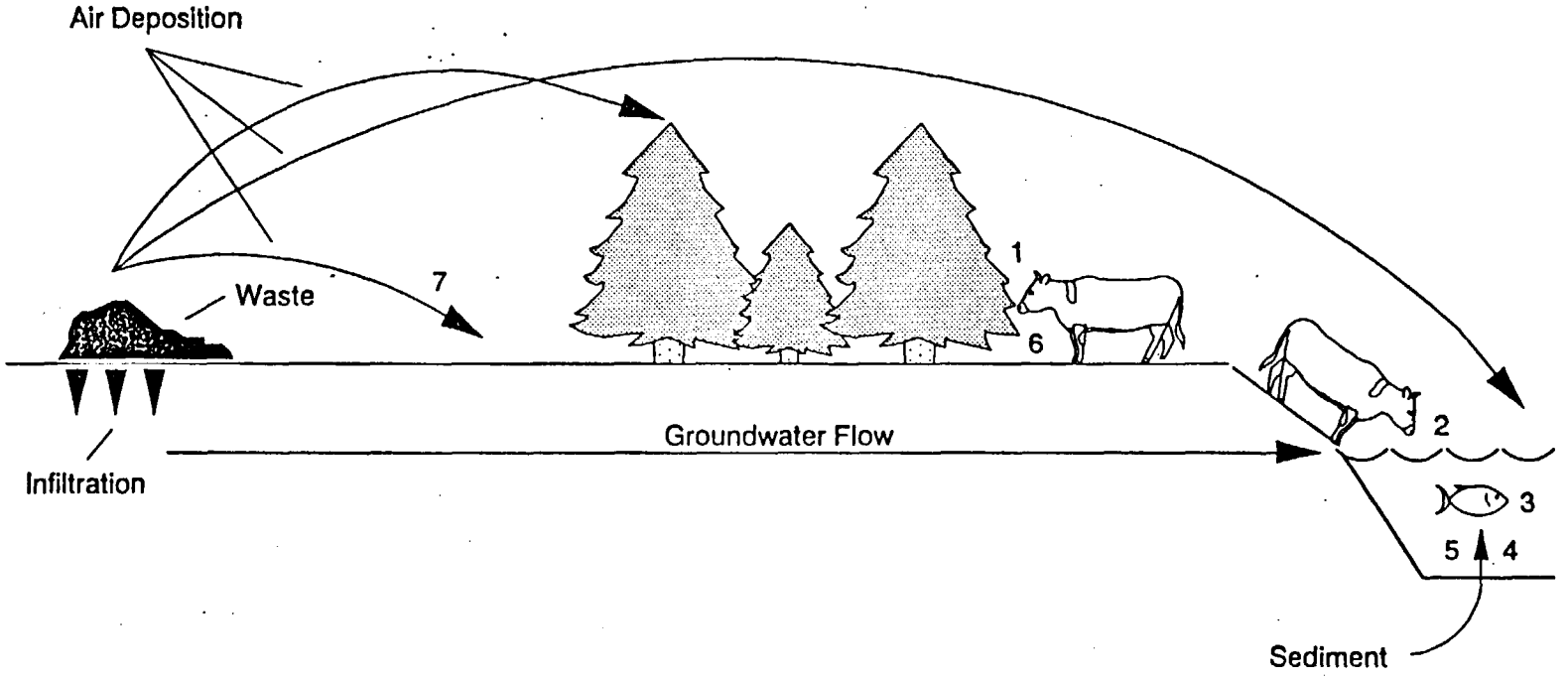
Wetland Communities:

Wetland coverage exists within the study area according to the wetland delineation [Talbot, 1990]. The wetland areas on and off-site represent communities potentially affected by site related residues. These wetland areas were defined in Section 3 as the Phragmites wetland community, and the elm-ash-red maple community.

Endangered Species:

There have been no reports of endangered or otherwise unique species inhabiting the Site. However, the Pie-Billed Grebe has been identified by the Natural Heritage Program as inhabiting an area on or in the immediate vicinity of the project site. Although no Federal status has been designated for this bird, it has been designated as endangered by the State of New Jersey. It has been assigned a State Element Rank of "S1." A ranking of S1 is assigned to those species that are

FIGURE S-6



	Type of Exposure	Quantifiable?
1	Consumption of biota by terrestrial organism	No
2	Consumption of surface water by terrestrial organism	No
3	Surface water to aquatic organism	Yes
4	Sediment to benthic organism	Yes
5	Sediment to aquatic organism	No
6	Consumption of soil by terrestrial organism	No
7	Inhalation by terrestrial organism *	No

* Air pathway incomplete presently but will be complete in the future.

"critically imperiled in state because of extreme rarity (5 or fewer occurrences or very few remaining individuals. . .)."

The Pie-Billed Grebe inhabits the Pedricktown Marsh, located hydraulically upgradient of the site. Because there is no direct hydraulic communication from the site to the Marsh, there is no hydraulic contribution of contaminants to the habitat of the Pie-Billed Grebe. The potential exists for future air migration of residues from the site to this Marsh. Although, no data was collected in the marsh as part of the investigation of this site, the trend demonstrated by existing lead data for this site indicates that, based on the distance from the marsh to the site, lead concentrations will approximate background levels in the Marsh. This indicates that air migration of lead to this marsh has not occurred in the past.

Rare Species or Rare Natural Communities:

The Natural Heritage Program data base also identifies six rare species or rare natural communities located in the general vicinity of the project site. These include birds (the Vesper Sparrow), sites (the Freshwater Tidal Marsh Complex, and the Bald Eagle Wintering Site) and plants (the Sensitive Joint Vetch, the Mud Plantain and the Minute Duckweed). (See Attachment A for results of the data base search.)

5.01.03 Exposure Scenarios

The following exposure scenarios have been evaluated based on the confirmed presence of lead on the site (See Figure S-6).

Air: According to the RI Report (Section 6.08.01), waste sources have been immobilized in order to prevent air migration of lead. This has rendered the current inhalation pathway for lead exposures to wildlife incomplete. As for human health, (see 6.08.01, RI Report), the future air exposure pathway via inhalation is complete for ecological exposures on and off-site. As explained in the RI, although measures have been employed for the prevention of fugitive dust emissions at the site, these measures are temporary. It is expected that the inhalation pathway will become complete when the material used to prevent dust emissions from the waste piles ultimately degrades.

Surface Water: The surface water pathway for on-site terrestrial organisms has been determined to be complete. Ingestion of surface water in the West Stream and in the wetland by terrestrial organisms presents a potential for exposure to these organisms.

The exposure pathway to off-site organisms, both terrestrial and aquatic, through surface water is complete as well. Terrestrial organisms, through ingestion of surface water from the East and West Streams adjacent to and downstream of the site, may be exposed to chemical residues in the water. Aquatic organisms in the East and West Streams, downstream of the site, may be chronically exposed to chemical residues in these waters.

Sediment: The exposure pathway of benthic organisms to stream sediments is complete. The West Stream - both on and downstream of the site - and the East Stream likely support bottom-dwelling organisms that are exposed to stream sediments.

Soils: The exposure pathway via contact of terrestrial organisms to Site soils is determined to be complete. Burrowing animals, ground dwelling animals, and reptiles that exist in close contact with the ground surface will experience epidermal exposure to chemical residues in the soil. This pathway is determined to be complete for both on-site and off-site exposures scenarios.

Biota: Exposure of organisms through consumption of biota within the study area is complete exposure pathway. Vegetation on the site is exposed via both absorption through foliage and through active transport through plant roots [Eisler, 1988]. Herbivorous organisms inhabiting the site are exposed via these biota to chemical residues. Omnivorous and carnivorous species on the site will be exposed via consumption of prey species exposed through one of the pathways identified above. A complete exposure scenario exists for piscivorous birds who consume potentially exposed aquatic organisms in the East and West Streams.

Waste: The exposure pathway via direct contact to waste material is determined to be incomplete. The area containing wastes is surrounded by a chain-link fence which precludes intrusion into the waste area. Furthermore, there exists no stimulus in the area where waste is stored to induce the movement of wildlife into this area.

SECTION 6 - RISK OR THREAT CHARACTERIZATION

6.01 Characterization of Effect

6.01.01 Probability of Effects

As shown in Section 5, a number of viable exposure scenarios exist that make it very likely that organisms associated with the study area are exposed to lead residues. The probability of effects with respect to identified exposure scenarios is discussed as follows:

Surface Water: As discussed in Section 3.03, it is not expected that the East and West Streams support varied or significant fish populations. Organisms that do inhabit these streams, however, are chronically exposed to lead from the site. Because of this chronic exposure, aquatic organisms are examined as a sensitive indicator of lead. The effects of this exposure are quantified in the *Magnitude of Effects* Section, below.

Sediment: Because chronic exposures of lead residues in sediments occur to benthic organisms in the West Stream, these organisms are assumed to be the most sensitive indicators of ecological effects due to lead in sediment. These effects are quantified in the *Magnitude of Effects* Section, below.

Biota: Vegetation has the potential to uptake available lead [Eisler, 1988]. However, lead does not significantly biomagnify in vegetation or in organisms as a result of consumption of exposed biota [Eisler, 1988]. Therefore, should exposures of lead occur to organisms in these communities, they can be expected to be consistent with ambient concentrations. Consumption of biota on the site, for most organisms, will likely occur on a transient basis. For example, the presence of white tailed deer has been confirmed on the site and deer are likely exposed to site residues through consumption of exposed vegetation. However, deer will browse vegetation outside the range of where lead concentrations occur as well. Hence, the effects to terrestrial wildlife through consumption of biota are not quantifiable.

Soil: Exposure to lead in soils through ingestion is likely the most significant to organisms that burrow in soils where the highest concentrations of lead have been identified. In order to quantify the effects of exposures to these organisms, a tissue sampling effort would be necessary. A statistically significant population for this study would exceed the number of organisms potentially supported by the impacted area. Therefore, the effects to these organisms are not quantifiable.

Air: Effects as a result of future inhalation of airborne contaminants would be most significant to organisms that permanently reside in the area. Although it has been stated that the airborne exposure pathway will become complete in the future (Section 6.08.01 of the RI Report), no data exists for future airborne concentrations. Therefore, the effects due to air exposures are not quantifiable for wildlife receptor populations.

6.01.02 Magnitude of Effects

As discussed above, due to chronic exposures to lead residues, aquatic and benthic organisms are considered to be the most sensitive receptors of site related lead. Residues in surface water and sediment are measurable indicators of ecological effects.

The effects to these populations are quantified as follows:

Surface Water: As put forth by the USEPA [1987], ambient water quality criteria established for the protection of aquatic life from lead are dependent on water hardness. Table VI presents three categories of water hardness. For each category the criterion is provided.

Table VI: Stream Data - Aquatic Life Criteria Comparison

Water Hardness (mg/l $CaCO_3$)	Chronic Lead Criterion (ug/l)
$\leq$ 50	1.3
50-100	3.2
100-200	7.7

Although hardness was not determined on samples from the East and West Streams, the lead concentrations reported consistently exceed the 7.7 micrograms/liter value. Values for chronic exposures to lead are exceeded in each surface water sample, suggesting that effects to aquatic life as a result of lead residues are likely. The locations of these water samples (Figure S-3) correspond to the locations of the Phragmites wetland and the elm-ash-red maple forest communities identified in Section 3.02 and shown in Figure S-2. These communities represent wetlands as defined by the wetland delineation (Appendix R). As such they represent potentially significant communities that may be affected by site related residues. Effects on these communities are most likely to be manifested in the amphibious creatures associated with these wetlands that are identified in Table III.

Sediment: As described in Section 2.04.02 guidance values have been established by the NOAA for lead in sediment. Figures S-4 and S-5 depict sediment concentrations detected in the stream and the results of the comparison of these concentrations to NOAA effects ranges. The NOAA has also suggested concentrations at which lead in sediment (300 mg/kg) has been consistently observed to have adverse effects on benthic organisms. Sediment concentrations from the West Stream acquired in 1988 (Table 8, RI) exceed these concentrations. One of the two samples taken from the

East Stream in 1988 exceeds the NOAA referenced value. In 14 out of 17 locations sampled in 1989 in the West Stream, lead concentrations exceed the NOAA referenced value (300 mg/kg). Sediment analyses from the East Stream in one out of the six 1989 samples exceeded the 300 mg/kg levels referenced by NOAA [1990]. Examination of the sediment lead concentrations below the surface suggests that all but one location on the West Stream have less than the 300 mg/kg level referenced in NOAA within 12 inches of the surface, and the one exception contained 357 mg/kg. In the East Stream all locations meet the 300 mg/kg level referenced by NOAA within six inches of the surface.

6.01.03 Temporal Character of Effects

As discussed in the RI Report (Section 5.02) lead is persistent in the environment and is not degraded by natural processes. Eisler [1988] suggests that lead is effectively cycled within an ecosystem. Because lead is not concentrated in the higher trophic levels due to bioconcentration, some lead is excreted by higher organisms when biota containing lead are consumed. The excreted lead is then available for exposure to plants again. This observation suggests that the lead in an ecosystem will be persistent.

6.02 Applicable or Relevant and Appropriate Requirements (ARARs)

6.02.01 Chemical Specific ARARs

The Federal Water Pollution Control Act (a.k.a. the Clean Water Act) provides criteria for the protection of aquatic life. The criteria for lead as established by this act is a hardness based criteria; a comparison of the criteria for three water hardness ranges against water quality data is presented in Table VI.

6.02.02 Location Specific ARARs

The Endangered Species Act requires action to avoid jeopardizing the continued existence of listed endangered or threatened species or modification of their habitat. Endangered species are addressed in Section 5.01.

SECTION 7 - CONCLUSIONS AND LIMITATIONS OF ANALYSIS

7.01 Conclusions

- Based upon an ecological characterization of the site and surroundings, six areas (designated as communities) on and surrounding the site potentially support diverse wildlife populations. These consist of the channelized streams east and west of the site, the mixed deciduous forest, the elm-ash-red maple forest, and the Phragmites wetland.

- Of these, two communities have been classified as wetlands [Talbot, 1990]. These are, therefore, significant ecological communities. The communities affected are the Phragmites wetland, and the elm-ash-red maple forest.

- Wildlife in the study area could be exposed to lead residues in soils and vegetation.

- Surface sediment (0-3 inch depth) quality data from the West Stream, portions of the East Stream and selected locations in the on-site wetland indicates a potential for sediment to present a lead exposure risk to benthic organisms.

- Although hardness data is unavailable, the lead concentration in the West Stream water column likely exceeds ambient water quality chronic criteria for protection of aquatic life.

- The stretch of the West Streams from which water samples were collected in 1988 and 1989 is physically incapable of supporting fish for reasons unrelated to the site. However, reaches farther downstream of the site may support fish species. The East Stream may support fish species, both in the vicinity of the site and downstream.

- Pie-Billed Grebe is a significant potential wildlife receptor (as defined by USEPA [1989]), inhabiting the Pedricktown Marsh to the north. However, available data suggests that no effect has occurred as a result of lead from the site to the habitat of the grebe.

7.02 Limitations of Analysis

The conclusions and interpretations developed in this assessment have been constrained by the following limitations in data and information:

- Populations of aquatic organisms potentially inhabiting waters downstream of the site have not been characterized. This has precluded analysis of impacts to specific aquatic species downstream.

- Exposures to wildlife through consumption of biota have not been quantified due to both the absence of lead data for plants and the absence of criteria for the determination of significance for this pathway. Although data exists regarding soil and surface water contaminant levels, exposures to terrestrial wildlife through ingestion of both surface water and soils as well as through inhalation have not been quantified.

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ATTACHMENT A

Let's protect our earth

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Parks and Forestry
Office of Natural Lands Management
CN 404, Trenton, New Jersey 08625
(609) 984-1339
FAX (609) 984-1427

November 14, 1990

Frank Hale
O'Brien & Gere Engineers, Inc.
440 Viking Drive, Suite 250
Virginia Beach, Virginia 23452

Re: NSNJ/NL NPL Site

Dear Mr. Hale:

Thank you for your data request regarding rare species information for the above referenced project site in Oldmans Twp., Salem County.

The Natural Heritage Data Base does not have any records for rare plants, animals or natural communities within the area of interest. However, there is a record for a pied-billed grebe occurrence just north of the project site. The attached list provides additional information about this occurrence.

Also, attached is a list of rare species from records in the general vicinity of the project site (within approx. 3 mi. for animals, 1.5 mi. for plants and communities). Additionally, enclosed is a list of rare vertebrates of Salem County together with a description of their habitats. If suitable habitat is present at the project site, these species would have potential to be present. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend you contact the Division of Fish, Game and Wildlife Endangered and Nongame Species Program.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

Thank you for consulting the Natural Heritage Program. The fee to cover the cost of processing this data request is $30.00. Payment should be made payable to Treasurer, State of New Jersey and mailed to Office of Natural Lands Management, DEP Div. of Parks and Forestry, CN404, Trenton, NJ 08625-0404. To ensure that your payment is properly credited, please provide a copy of this letter with your remittance. Feel free to contact us again regarding any future data requests.

Sincerely,

Thomas F. Breden

Thomas F. Breden
Coordinator/Ecologist
Natural Heritage Program

cc: JoAnn Frier-Murza
Thomas Hampton

NATURAL LANDS MANAGEMENT

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the data base. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Division of Coastal Resources, Bureau of Freshwater Wetlands, CN 402, Trenton, NJ 08625.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

14 NOV 1990

ON OR IN THE IMMEDIATE VICINITY OF THE PROJECT SITE
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK	DATE OBSERVED	IDENT.	LOCATION
*** Vertebrates									
PODILYMBUS PODICEPS	PIED-BILLED GREBE		E		G5	S1	1990-04-24	Y	PEDRICKTOWN MARSH, OLDMANS TWP.

1 Records Processed

GENERAL VICINITY OF PROJECT SITE
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK	DATE OBSERVED	IDENT.
*** Vertebrates								
POOECETES GRAMINEUS	VESPER SPARROW		E		G5	S2	1984-06-01	Y
POOECETES GRAMINEUS	VESPER SPARROW		E		G5	S2	1984-05-21	Y
*** Ecosystems								
FRESHWATER TIDAL MARSH COMPLEX	FRESHWATER TIDAL MARSH COMPLEX				G4?	S3?	1972-??-??	?
*** Other types								
BALD EAGLE WINTERING SITE	BALD EAGLE WINTERING SITE				G?	S?	1987-01-??	Y
*** Vascular plants								
AESCHYNOMENE VIRGINICA	SENSITIVE JOINT-VETCH	C2	E	LP	G2	S1	1897-08-07	Y
HETERANTHERA MULTIFLORA	MUD PLANTAIN				G4	S1	1934-11-07	Y
LEMNA PERPUSILLA	MINUTE DUCKWEED				G5	SU	1891-09-??	Y

7 Records Processed

5\22\87

NEW JERSEY NATURAL HERITAGE PROGRAM
POTENTIAL THREATENED AND ENDANGERED VERTEBRATE SPECIES
IN SALEM COUNTY

AMERICAN BITTERN	FEDERAL STATUS:	COUNTY
BOTAURUS LENTIGINOSUS	STATE STATUS: LT	OCCURRENCE: ?

HABITAT COMMENTS
Fresh water bogs, swamps, wet fields, cattail and bulrush marshes, brackish and saltwater marshes and meadows.

BALD EAGLE	FEDERAL STATUS: LELT	COUNTY
HALIAEETUS LEUCOCEPHALUS	STATE STATUS: LE	OCCURRENCE: W*

HABITAT COMMENTS
Primarily near seacoasts, rivers, and large lakes.

BARRED OWL	FEDERAL STATUS:	COUNTY
STRIX VARIA	STATE STATUS: LT	OCCURRENCE: Y

HABITAT COMMENTS
Dense woodland and forest (conif. or hardwood), swamps, wooded river valleys, cabbage palm-live oak hammocks, especially where bordering streams, marshes, and meadows.

BOBOLINK	FEDERAL STATUS:	COUNTY
DOLICHONYX ORYZIVORUS	STATE STATUS: LT	OCCURRENCE: ?

HABITAT COMMENTS
Tall grass areas, flooded meadows, prairie, deep cultivated grains, alfalfa and clover fields. In migration and winter also in rice fields, marshes, and open woody areas.

BOG TURTLE	FEDERAL STATUS: C2	COUNTY
CLEMMYS MUHLENBERGII	STATE STATUS: LE	OCCURRENCE: Y

HABITAT COMMENTS
Slow, shallow rivulets of sphagnum bogs, swamps, and marshy meadows; sea level to 1200 m in Appalachians. Commonly basks on tussocks in morning in spring and early summer. Hibernates in subterreanean rivulet or seepage area.

COOPER'S HAWK	FEDERAL STATUS:	COUNTY
ACCIPITER COOPERII	STATE STATUS: LE	OCCURRENCE: W*

HABITAT COMMENTS
Primarily mature forest, either broadleaf or coniferous, mostly the former; also open woodland and forest edge.

GRASSHOPPER SPARROW AMMODRAMUS SAVANNARUM	FEDERAL STATUS: STATE STATUS: LT	COUNTY OCCURRENCE: B

HABITAT COMMENTS
Prairie, old fields, open grasslands, cultivated fields, savanna.

GREAT BLUE HERON ARDEA HERODIAS	FEDERAL STATUS: STATE STATUS: LT	COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and meadows.

NORTHERN HARRIER CIRCUS CYANEUS	FEDERAL STATUS: STATE STATUS: LE	COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Marshes, meadows, grasslands, and cultivated fields. Perches on ground or on stumps or posts.

OSPREY PANDION HALIAETUS	FEDERAL STATUS: STATE STATUS: LT	COUNTY OCCURRENCE: B

HABITAT COMMENTS
Primarily along rivers, lakes, and seacoasts, occurring widely in migration, often crossing land between bodies of water.

PEREGRINE FALCON FALCO PEREGRINUS	FEDERAL STATUS: LE STATE STATUS: LE	COUNTY OCCURRENCE: Y

HABITAT COMMENTS
"A variety of open situations from tundra, moorlands, steppe and seacoasts, especially where there are suitable nesting cliffs, to high mountains, more open forested regions, and even human population centers...".

PIED-BILLED GREBE PODILYMBUS PODICEPS	FEDERAL STATUS: STATE STATUS: LE	COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Lakes, ponds, sluggish streams, and marshes; in migration and in winter also in brackish bays and estuaries.

PINE BARRENS TREEFROG HYLA ANDERSONII	FEDERAL STATUS: C2 STATE STATUS: LE	COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Streams, ponds, cranberry bogs, and other wetland habitats. Post-breeding habitat the surrounding woodlands.

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RED-SHOULDERED HAWK BUTEO LINEATUS	FEDERAL STATUS: STATE STATUS: LT	COUNTY OCCURRENCE: W*

HABITAT COMMENTS
Moist and riverine forest, and in e. N. Am. in wooded swamps, foraging in forest edge and open woodland.

SAVANNAH SPARROW PASSERCULUS SANDWICHENSIS	FEDERAL STATUS: STATE STATUS: LT	COUNTY OCCURRENCE: Y

HABITAT COMMENTS
"Open areas, especially grasslands, tundra, meadows, bogs, farmlands, grassy areas with scattered bushes, and marshes, including salt marshes in the BELDINGI and ROSTRATUS groups (Subtropical and Temperate zones)".

SEDGE WREN CISTOTHORUS PLATENSIS	FEDERAL STATUS: STATE STATUS: LE	COUNTY OCCURRENCE: ?

HABITAT COMMENTS
Grasslands and savanna, especially where wet or boggy, sedge marshes, locally in dry cultivated grainfields. In migration and winter also in brushy grasslands.

SHORT-EARED OWL ASIO FLAMMEUS	FEDERAL STATUS: STATE STATUS: LE/S	COUNTY OCCURRENCE: W*

HABITAT COMMENTS
Open country, including prairie, meadows, tundra, moorlands, marshes, savanna, dunes, fields, and open woodland. Roosts by day on ground or on low open perches.

TIGER SALAMANDER AMBYSTOMA TIGRINUM	FEDERAL STATUS: STATE STATUS: LE	COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Found in virtually any habitat, providing there is a body of water nearby suitable for breeding. Terrestrial adults primarily subterranean.

UPLAND SANDPIPER BARTRAMIA LONGICAUDA	FEDERAL STATUS: STATE STATUS: LE	COUNTY OCCURRENCE: B

HABITAT COMMENTS
Grasslands, especially prairies, dry meadows, pastures, and (in Alaska) scattered woodlands at timberline; very rarely in migration along shores and mudflats.

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VESPER SPARROW	FEDERAL STATUS:	COUNTY
POOECETES GRAMINEUS	STATE STATUS: LE	OCCURRENCE: Y

HABITAT COMMENTS
"Plains, prairie, dry shrublands, savanna, weedy pastures, fields, sagebrush, arid scrub and woodland clearings".

DEFINITION OF ACRONYMS

FEDERAL STATUS

LE=listed endangered.
LT=listed threatened.
PE=proposed endangered.
PT=proposed threatened.
C2=candidate for listing.

STATE STATUS

LE=listed as endangered. (short-eared owl winter pop. listed as stable:S)
LT=listed as threatened.

COUNTY OCCURRENCE

Y=present year-round, breeds.
N=present year-round, not recorded breeding.
B=present during the summer, breeds.
W=present during the winter.
T=present as a transient.
?=present status undetermined.
*=indicates that the county is within the species known breeding range.

EXPLANATION OF CODES ON NATURAL HERITAGE LIST

1. FEDERAL STATUS CODES

U.S.FISH AND WILDLIFE CATEGORIES OF ENDANGERED AND THREATENED PLANTS AND ANIMALS

The following definitions are extracted from the September 27, 1985 U.S. Fish and Wildlife Service notice in the Federal Register:

LE--Taxa formally listed as endangered.

LT--Taxa formally listed as threatened.

PE--Taxa proposed to be formally listed as endangered.

PT--Taxa proposed to be formally listed as threatened.

S --Synonyms.

C1--Taxa for which the Service currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species.

C2 --Taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

C3 --Taxa that are no longer being considered for listing as threatened or endangered species. Such taxa are further coded to indicate three subcategories, depending on the reason(s) for removal from consideration.

> 3A--Taxa for which the Service has persuasive evidence of extinction.
>
> 3B--Names that, on the basis of current taxonomic understanding, usually as represented in published revisions and monographs, do not represent taxa meeting the Act's definition of "species".
>
> 3C--Taxa that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat.

The following definition is extracted from the January 1, 1989 U.S. Fish and Wildlife Service notice in the Federal Register:

E(S/A)-- Endangered (similarity of appearance species)

T(S/A)-- Threatened (similarity of appearance species)

2. STATE STATUS CODES

These refer to State listed endangered plant species and endangered and nongame animals:

D = declining nongame species
EX = extirpated nongame species
I = introduced nongame species
IN = increasing nongame species
E = endangered plant or animal species
T = threatened nongame species
P = peripheral nongame species
S = stable nongame species
U = undetermined nongame species

Status for animals separated by a slash(/) indicate a duel status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

3. REGIONAL STATUS CODES

Within the State Pinelands Region, an additional list of 54 endangered or threatened plant species has been established. Locations for many of these species are tracked by the Natural Heritage Database. These species are flagged in the regional status column with the code 'LP'.

4. EXPLANATION OF NATURAL HERITAGE PRIORITY ELEMENT RANKS

The Nature Conservancy has developed a rarity ranking system* for use in identifying elements (rare species and natural communities) of natural diversity most endangered with extinction. Each element is ranked according to it's rarity both in the state and globally. These ranks are used to prioritize conservation work so that the rarest most endangered elements receive attention first.

GLOBAL ELEMENT RANKS

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout it's range; in terms of occurrences, in the range of 21 to 100.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

*This ranking system is adapted from that which appears in 'The Nature Conservancy, 1988. Model Heritage Operations Manual. The Nature Conservancy. Arlington VA'.

GH = Of historical occurrence throughout its range i.e., formerly part of the established biota, with the expectation that it may be rediscovered.

GU = Possibly in peril range-wide but status uncertain; need more information.

GX = Believed to be extinct throughout range (e.g., Passenger Pigeon) with virtually no likelihood that it will be rediscovered.

G? = Species has not yet been ranked.

STATE ELEMENT RANKS

S1 = Critically imperiled in state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements which were formerly more abundant, but now through habitat destruction or some other critical factor of its biology have been demonstrably reduced in abundance. In essence, these are elements that even with intensive searching sizable additional occurrences are unlikely to be discovered.

S2 = Imperiled in state because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences. Habitat destruction being the primary cause of their rarity. Diligent searching may yield additional occurrences.

S3 = Rare in state with 21 to 100 occurrences (plant species in this category have only 21 to 50 occurrences). Includes elements which are widely distributed in the state but with small populations/acreages or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.

S4 = Apparently secure in state, with many occurrences.

S5 = Demonstrably secure in state and essentially ineradicable under present conditions.

SA = Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded; examples include european strays or western birds on the East Coast and visa-versa.

SE = A species clearly exotic in New Jersey which includes those species not native to North America as well as any other species deliberately or accidentally introduced into the state and are therefore not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions).

SH = Despite some searching of both historic occurrences and suitable habitat, no extant occurrences are known. Not all historic occurrences have been checked, and unsearched potential habitat remains. Until all leads are reasonably exhausted, elements ranked SH are considered possibly extant. While the last observed dates for most elements ranked SH are 50 or more years old, elements observed much more recently are also included when the only known occurrences have been destroyed.

SN = Regularly occurring, usually migratory and typically nonbreeding species for which no significant or effective habitat conservation measures can be taken in the state; this category includes migratory birds, bats, sea turtles, and cetaceans which do not breed in the state but pass through twice a year or may remain in the winter (or, in a few cases, the summer); included also are certain lepidoptera which regularly migrate to a state where they reproduce, but then completely die out every year with no return migration. Species in this category are so widely and unreliably distributed during migration or in winter that no small set of sites could be set aside with the hope of significantly furthering their conservation. Other nonbreeding, high globally-ranked species (such as the bald eagle, whooping crane or some seal species) which regularly spend some portion of the year at definite localities (and therefore have a valid conservation need in the state) are not

ranked SN but rather S1, S2, etc.

SR = Reported from the state, but without persuasive documentation which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report. Some of these are very recent discoveries for which NJNHP has not yet received first-hand information; others are old, obscure reports that are hard to dismiss because the habitat is now destroyed.

SRF = Reported falsely (in error) from New Jersey but this error persisting in the literature.

SU = Believed to be in peril but status uncertain. More information is needed to rank accurately.

SX = Apparently extirpated from state. All historic occurrences checked and a thorough search of potential habitat completed. The localities for many of these elements have been destroyed or greatly altered.

SXC = Species is presumed extirpated from the state but native populations collected from wild exist in cultivation.

Note: Ranks followed by '.1' indicate plant taxa documented from a single New Jersey location. A 'T' appearing in either the G Rank or S Rank, indicates that the infraspecific taxa is being ranked differently than the species. A 'Q' in the rank indicates That there is taxonomic uncertainty about the taxa being ranked (i.e., taxa is being accepted as full species in this list but may be treated as a subspecies taxa by others). To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).

5. IDENTIFICATION

This code refers to whether the identification of the species/community has been checked by a reliable individual and is indicative of significant habitat. Codes are as follows:

Y = Identification has been verified and is indicative of significant habitat.

BLANK = Identification has not been verified but there is no reason to believe it is not indicative of significant habitat.

? = Either it has not been determined if the record is indicative of significant habitat, or the identification of the species/community may be confusing or disputed.

CULTURAL RESOURCES SURVEY

INTRODUCTION

A Cultural Resources Survey (CRS) was conducted for the National Smelting of New Jersey (NSNJ), Inc./NL Industries, Inc. site in Pedricktown, New Jersey, as part of the overall site Remedial Investigation/Feasibility Study (RI/FS). The information from the CRS is incorporated herein as part of the RI/FS environmental analysis. At the request of the EPA Region II, a Stage IA CRS was conducted. The survey was conducted over the period from mid-November 1990 through early December 1990.

The purpose of a Cultural Resources Survey is to identify cultural resources within the project area. The objective of the CRS is to appraise the potential project impacts on historical, architectural and archaeological resources located within the study area. This is conducted under the auspices and criteria of the National Historical Preservation Act (NHPA) of 1966.

The Stage I survey is designed to determine the presence or absence of cultural resources in the project's potential impact area. The information from this survey can be used in developing and screening alternatives to minimize direct and indirect impacts on historic and archaeological properties. The first unit of study of a Stage I survey is the Stage IA, a literature search and sensitivity study. This initial level of survey includes a comprehensive documentary research designed to identify known or potential historical, architectural, and/or archaeological resources within a project area. The primary objective of the Stage IA survey is to evaluate the differential sensitivity of the project area for the presence of cultural resources. The literature review is complemented by an evaluation of the nature and extent of the proposed project, a reconnaissance of the site, and a surface inspection. Also, consideration of the effect of prior ground disturbance on the probability of identifying cultural resources is assessed.

PROJECT DESCRIPTION

In this survey, the study area is considered as the planning area of the project (the area addressed by the RI/FS). Referring to Figure 5 of the RI/FS Report (October 1990), the project area is bounded by the Pennsgrove-Pedricktown Road on the south, Benjamin Green Road on the west, Route 130 on the north and Porcupine Road (or Straughtens Mill Road) on the east. Figure CRS-1 of this section also outlines the location of the study area.

The project area is located in south-western New Jersey, approximately two miles east of the Delaware River and seven miles north of the Delaware Memorial Bridge. The study area is located in the Oldmans Township of Salem County, approximately two miles west of the border of Gloucester County (Oldmans Creek forms the border between the counties). The site is located in a rural area, with intermittent industry in the general vicinity. The study area includes the property occupied by National Smelting of NJ and formerly occupied by NL Industries, several small, light industrial businesses, several private homes and properties, and a relatively large B.F.

Goodrich manufacturing facility. The site is traversed by an active railroad line (Pennsylvania-Reading Seashore Lines) running southwest - northeast.

Numerous references and resources were used in this survey. Table CRS-1 provides a list of these references.

RESEARCH RESULTS - DISCUSSION OF CULTURAL RESOURCES

A. Historical Background

The land of Oldmans Township was first settled by Europeans when the Swedish arrived in the 1630's. Prior to this, the area was inhabited by Indians, who referred to the area as Kachikanizachen. Pedricktown itself, first known as Pedricksburg, was named in honor of the pioneer, Roger Pedrick. Pedrick purchased 1000 acres and settled into the area within Oldmans Township in the mid-1600's. From that date, Pedricktown grew as the largest village in the rich farming region of the Oldmans Township, thriving primarily on a flour mill, and a shipping trade in dairy and garden products. The area has evolved slowly up to the current date. The primarily rural Pedricktown area currently includes private homes, small farms and intermittent industrial facilities.

The study area itself includes several areas of industrial development, including (but not limited to):

- NSNJ lead smelting property;
- a pallet-making facility; (Pioneer Pallet)
- GBM Industries (machine shop);
- Corrosion Control;
- Wistar Equipment;
- B.F. Goodrich; and
- Airco (gas products).
- BFI - MainTech

The history of the NSNJ/NL property is detailed in Section 1.02 of the Remedial Investigation Report (October 1990).

B. Previous Archaeological Survey(s) in the Area

Archaeological studies within five miles of the study area have revealed several relics of Indian villages, estimated to includes civilizations of both 1000 years old and up to 5000 years old. Figure 1 indicates the approximate locations of these archaeological findings.

A dig on the Ralph Lerro farm, near Oldmans Creek, was conducted in the summer of 1970. At this dig, surface artifacts such as banner stones used for game hunting were found, indicative of an Archaic (3500 B.C. to 500 B.C.) campsite perhaps 5000 years old. Further investigation revealed subsurface artifacts of a more recent Indian culture (Woodland; 200 A.D. to 1400 A.D.), including skeletons, arrowheads and clay pot shards, estimated to be 1000 years old. The archaeologists involved in this dig were quoted as saying that many artifacts which fell above the plow line were destroyed over the years.

A dig on the nearby Salisbury Farm in Gloucester County (~3 miles northeast of the study area), revealed significant findings of similar Indian artifacts. Likewise, the investigations as part of the CRS for the renovation of the Harrisonville Road Bridge 5-B-2 (Ref. #16a) concurred with the other studies mentioned. This bridge is located approximately two miles east of the study area. A variety of Archaic and Woodland materials were collected from the banks of the tributary to Oldmans Creek, in the immediate area of the bridge.

References 16b and 16c discuss CRS's conducted for the property immediately north of the study area, on the northern side of Route 130. These areas were studied as part of a plan to expand the use of the property as a landfill/dredging dump. The report in 16b summarizes that two prehistoric archaeological sites were associated with the tract, and that they had both been disturbed by existing dredging and diking. However, material from one of the sites within the area was salvageable. It was recommended that a further assessment of the salvageable deposit be conducted. Reference 16c is the draft report on the recommended follow-up assessment (the final report was not available from the NJDEP archives).

Reference 16c summarizes that the artifacts recovered were from previously disturbed soils, and that the likely original location of the artifacts was no longer intact. Therefore, no preservation measures were recommended for this area.

Reference 16d concurs that many areas immediately along the shore of the Delaware River have been obliterated by fill, construction or natural changes, thus leaving little potential for containing significant cultural remains. However, it was noted that potential in-land ("terrestrial") disposal sites should be further studied (Phase I CRS) to determine if cultural resources are present, and pursued as a Phase II CRS if such resources are identified.

Reference 16e is a summary of Phase IA CRS studies of four separate study areas, as part of an expansion plan of the Gloucester County Utilities Authority. One of the study areas is located in Logan Township, approximately 3 miles northeast of the NSNJ/NL Site. This area is in the vicinity of the Raccoon Point Site. An excavation at Raccoon Point in the mid-1940's revealed a large number of artifacts. The Raccoon Point Site was considered as very sensitive for prehistoric remains, and an archaeological testing program was recommended to assess the presence or absence of cultural remains, and to consider the extent of prior disturbance.

C. Literature Review & Survey Summary

A review of the National and State Registers of Historic Places (References 1 - 3) revealed no sites located within the study area. However, the following registered sites of close proximity to the study area were noted:

1. Salem County - Oldmans Township

   - no listings

2. Gloucester County - Logan Township

   - Prehistoric Archaeological Site (SHPO Opinion)
     (assumed to be the Raccoon Point Site; exact location not given)

- Salisbury Farm (State and National Registers);
  3 miles from the study area (archaeological site; location is indicated on Figure CRS-1)

3. Gloucester County - Swedesboro Borough (5 - 10 miles from study area)

   - several structures of historical or architectural significance. Not in close proximity to the study area.

(Note: the SHPO, State Historic Preservation Officers, which includes the Commissioner of the NJDEP, can make determinations of historic significance and place sites on the State register.)

A review of the historical/commemorative maps and surveys, and summary of conversations involving those references listed in References 4 - 14, revealed the following items of historical, architectural or archaeological significance:

1. Three structures of architectural significance, listed with the NJDEP as part of the Gloucester County Architectural Survey (listed in 1986), are located in the Logan Township of Gloucester County (3 - 4 miles from the study area). These are indicated on Figure CRS-1. The three structures are not of significance to the study area;

2. The Salem County historical map indicates that the shell of a home circa 1763 ("Biddle" or "Beetle" House), is located approximately 4 miles southwest of the study area. This is not of significance to the study area;

3. The Gloucester County historical map indicates that several historical structures exist in Swedesboro and Bridgeport. However, the location of these (~ 5 miles away) indicate that these are insignificant to the study area;

4. Conversations with historical and archaeological "experts" in the area indicated that there are no known historical nor architectural structures or areas, including cemeteries, of significance within the study area. No record nor recollection of archaeological sampling actually within the study area was revealed.

A site reconnaissance and limited surface inspection conducted on November 20, 1990, revealed no evidence of archaeological artifacts, or other signs of historical, archaeological or architectural resources.

SURVEY RESULTS - IDENTIFIED IMPACTS

Based on the information presented in this CRS, the potential cultural resource identified in this study area is the possible existence of archaeological remains of former Indian cultures. The possible existence of such remains must be considered in conjunction with the extent of disturbance (natural and artificial) which has occurred over time in the study area.

Significant portions of the NSNJ/NL property have been graded and developed as part of the operations and closure of the plant. Likewise, many other areas within the study area have been developed and/or farmed, thus likely disturbing, and possibly removing, existing archaeological remains (if any existed).

As of the date of this CRS, the remedial actions to be conducted at the site have not been selected. Thus, a broad consideration of the potential impact of possible options is considered below.

The potential impact of selected site activities on possible any cultural resources centers on:

- the possible existence of archaeological resources, and

- the extent of remaining undisturbed areas.

It is important to consider the possibility of such archaeological remains, based on the finds within five miles of the study area, and the regard with which these other identified sites are viewed (i.e., National and State Registers of Historic Places).

RECOMMENDATIONS

It is recommended that, for remedial options to be considered in undisturbed areas, a Phase IB survey be conducted. Such a field survey would accomplish two goals:

a. Assess the potential presence of significant archaeological remains actually within the study area, which are anticipated to be disturbed under a selected remedial action; and

b. Assess whether any identified artifacts are intact, and in sufficient quality, quantity and condition so as to warrant protection.

If the only remedial actions to be considered are in portion(s) of the study area with significant previous disturbance, then, based on the findings of previous CRS's (referenced), it is unlikely that archaeological remains of cultural significance could be identified and secured as preserveable resources. In such a case, no further survey is recommended.

TABLE CRS-1

LIST OF REFERENCES

1. National Registry of Historic Places, index of listed properties for Salem County, New Jersey (updated as of November 16, 1990);

2. National Registry of Historic Places, index of listed properties for Gloucester County, New Jersey (updated as of November 21, 1990);

3. New Jersey Register of Historic Places (1989-90 update);

4. Map of Historic Sites in Gloucester County (1976, Bicentennial commemorative map);

5. Map of Historic Sites in Salem County Existing During the American Revolution (1975, Bicentennial commemorative map);

6. Meeting and conversation with Dan Saunders, Senior Historic Preservation Specialist, Office of New Jersey Heritage, Historical & Natural Resources, New Jersey Department of the Environment (NJDEP);

7. Meeting and conversation with Mrs. Edith Hoelle, Curator of the Gloucester County Historical Society;

8. Meeting and conversation with Mr. Curtis Harker, Curator of the museum at the Salem County Historical Society;

9. Resource Inventory for the Study of Alternatives for the New Jersey Coastal Heritage Trail;

10. Conversations with Mr. Albert Lemcke of the Salem County Cultural and Heritage Commission, under the Salem County Planning Board;

11. Conversations with Dr. Charles Liebeknecht, of the Lower Delaware Valley Archaeological Society;

12. Conversations with Mrs. Helen Keating, wife of the president of the Oldmans Historical Society;

13. Conversations with Mr. George Morris, member of the Oldmans Historical Society, and local archaeologist;

14. Gloucester County Survey of Architectural Resources, archived by the NJDEP;

TABLE CRS-1
LIST OF REFERENCES
(continued)

15. Historical American Buildings Survey Drawings, under the Work Projects Administration of the 1930's;

16. The following CRS's, or similar surveys, for previous projects in the immediate vicinity of the study area:

    a. Archaeological Assessment of Proposed Replacement of Bridge 5-B-2, Harrisonville Road, Logan Township, Gloucester County, NJ (1/13/81);

    b. Cultural Resources Reconnaissance of Oldmans No. 1 Disposal Area, Oldmans Township, Salem County, NJ (May 1982);

    c. Cultural Resource Data Recovery (Survey) at Site 28-SA-46, Oldmans Disposal Area No. 1, Oldmans Township, Salem County NJ (December 1982, Draft);

    d. Delaware River Comprehensive Navigation Study (Interim): Cultural Resources Sensitivity Reconnaissance (November 1983);

    e. Stage IA Cultural Resources Survey of the Gloucester County Utilities Authority 201 Facilities Plan, Gloucester County, NJ (July 1984);

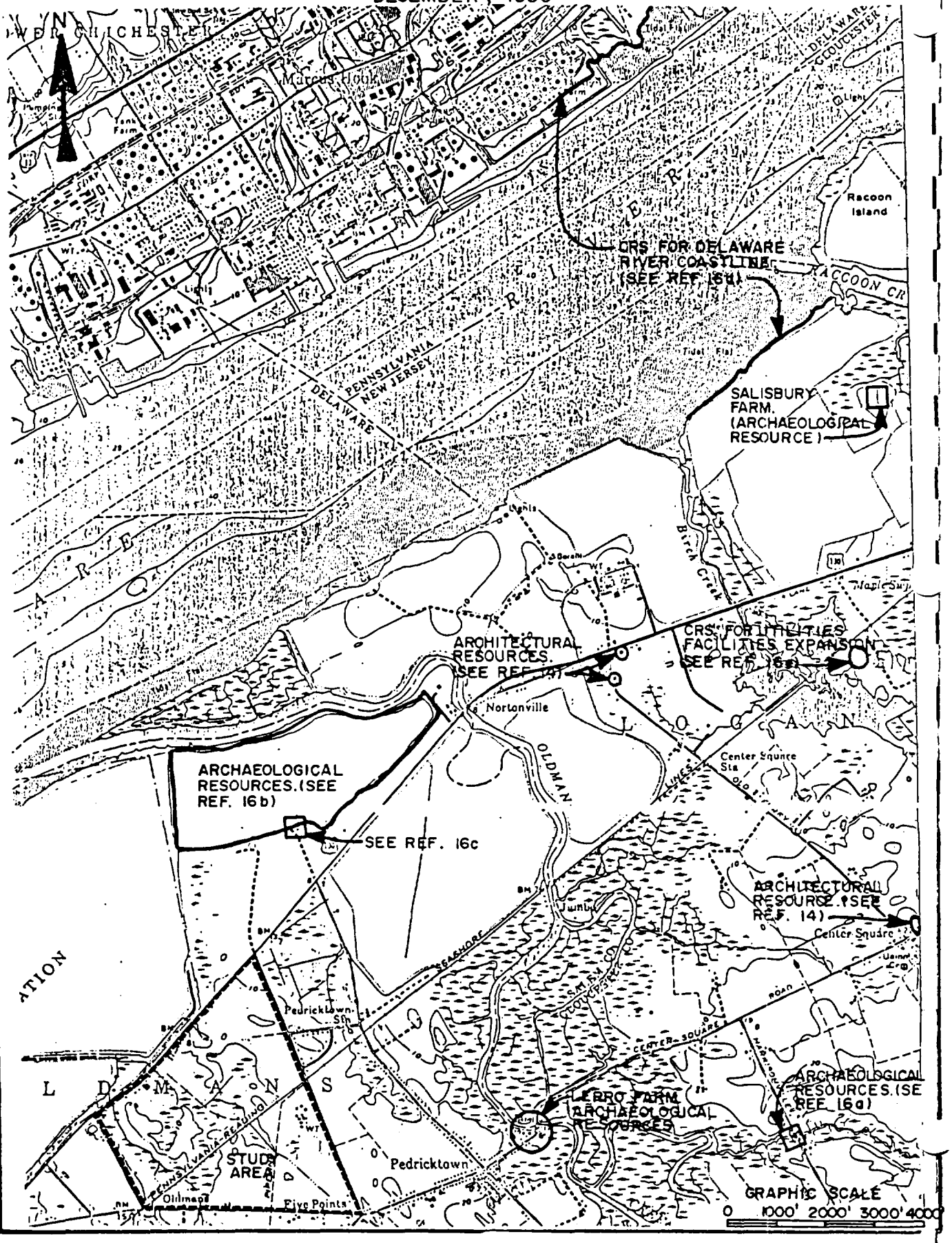
17. "Samples of History - Pedricktown", Pedricktown newspaper, October 5, 1977;

18. "Place Names of Salem County, N.J.", Salem County Historical Society, 1964.

19. 8/20/70 article in the Philadelphia Enquirer, "Pedricktown Dig Reveals Indian As Archaeologists Probe Farm".

FIGURE T-1

LOCATIONS OF CULTURAL RESOURCES
NSNJ/NL SITE
PEDRICKTOWN, NEW JERSEY
DECEMBER, 1990



NLI 001 2316

O'BRIEN&GERE ENGINEERS, INC.

063397

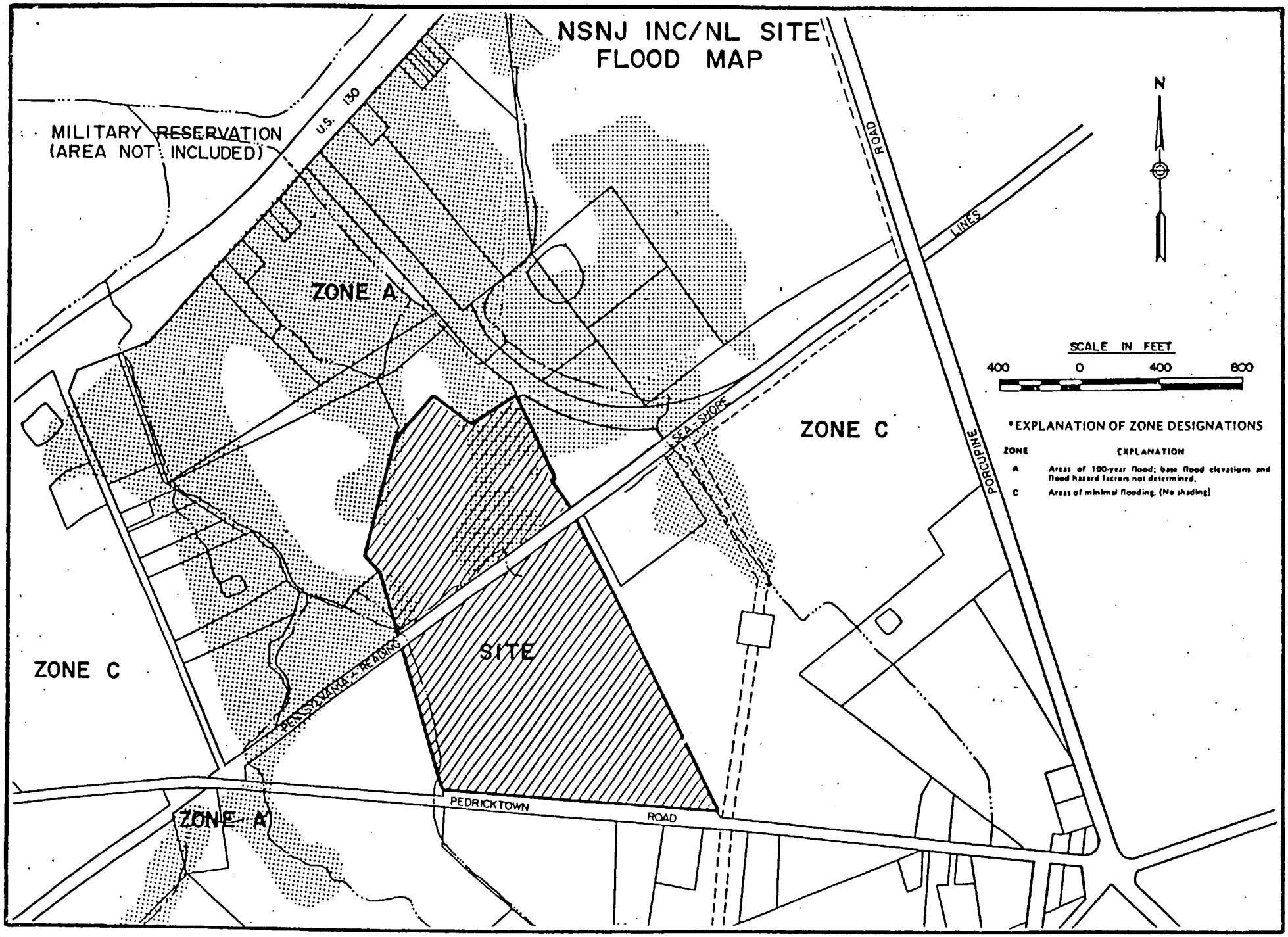


FIGURE U-1

NLI 001 2317

O'BRIEN&GERE ENGINEERS, INC.

O'BRIEN & GERE

17 December 1990

Chief, Site Investigations and
Compliance Branch
Emergency and Remedial Response
Division - Room 720
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Attention: Mr. Michael Gilbert, Project Officer

File: 2844.014

Re: NSNJ Site

Dear Mr. Gilbert:

At the request of Stephen W. Holt of NL Industries, the enclosed Appendices R-U of the Remedial Investigation for the National Smelting of New Jersey/NL Industries, Inc. Site in Pedricktown, New Jersey are being forwarded. Based on our 17 December telephone conversation, six copies are being transmitted to USEPA. These Appendices present the following information requested by the USEPA:

Appendix R - Wetland Assessment
Appendix S - Ecological Assessment
Appendix T - Cultural Resource Survey
Appendix U - Flood Plain

If you have any questions or require any additional information, please contact me at (804) 431-2966.

Very Truly Yours,

O'BRIEN & GERE ENGINEERS, INC.

Frank D. Hale, P.E.
Managing Engineer

FDH:bh
Enclosure

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